

modern machine shop

FEATURES IN
BRIEF
See Page 2

PRODUCING
SMALL PARTS
See Page 102

DESIGN
See Page 112

JANUARY
1957



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JANUARY

1957

Vol. 29

No. 8

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modern machine shop

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- 112** Cost Reduction Through Proper Design • By Fred Rogers
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(For more information on cover advertisements, use Reader Service Cards
 opposite pages 32 and 372.)

FEATURES IN

SPECIAL MACHINE SHOP FOR SMALL PARTS PRODUCTION

By **Gilbert C. Close**

To cut costs, a major aircraft producer has installed a specialized machine for producing small parts with a minimum of tooling and paperwork. Illustrations show the machine tools used in this shop, as well as typical parts produced.

Page 102

COST REDUCTION THROUGH PROPER DESIGN

By **Fred Rogers**

As clearly emphasized in this first installment of a two-part article, intimate knowledge by the designer of machining operations to be performed on various parts involved in an assembly is of great importance for controlling costs.

Page 112

COST-SAVING SETUP FOR GRINDING INDUSTRIAL SPRINGS

This article illustrates and describes how a leading spring manufacturer uses a special tandem grinder to solve spring grinding problems.

Page 120

WELDMENTS IN MACHINE TOOL CONSTRUCTION

By **B. J. Brugge**

How good appearance can be combined with high strength and rigidity in heavy weldments is pointed out in this article discussing the construction of a recently developed heavy-duty precision boring and milling machine.

Page 122

JANUARY
1957



THIS ISSUE

ANTI-FRICTION ROLLER BEARING STEADY REST

By **W. M. Halliday**

The discussion covers the development of a lathe steady rest designed especially to minimize friction and damage in turning long small diameter soft metal parts.

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No. 8

MACHINING STAINLESS STEEL

By **G. J. Stevens**

This case history points out how worn shop equipment was improved to solve the problem of vibration in utilizing a wide form tool in machining $\frac{1}{4}$ -inch diameter Type 303 stainless steel.

Page 128

THE SUPERVISOR AS A TEACHER

By **Alfred M. Cooper**

The role of the supervisor both in job training and conference training is discussed in this article. The author emphasizes the fact that, among the essential qualifications of a good industrial supervisor, the ability to teach must rate not far behind the ability to delegate and the ability to cooperate.

Page 130



MACHINING CAST ARMOR WITH INSERT TOOLING

Heavy-duty indexable insert tooling is used to turn, face and bore $38\frac{1}{2}$ -inch diameter pieces of cast armor having a Brinell hardness of 280 to 300 except in some chilled spots that are still harder.

Page 154

HOW THE SLAYSMAN COMPANY REDUCED THREADING TIME BY 97%

The Slaysman Company, a large machine shop and parts sub-contractor in Baltimore, reduced threading time on one contract operation from 2 hours to 4 minutes by the installation of a LANDMACO Threading Machine.

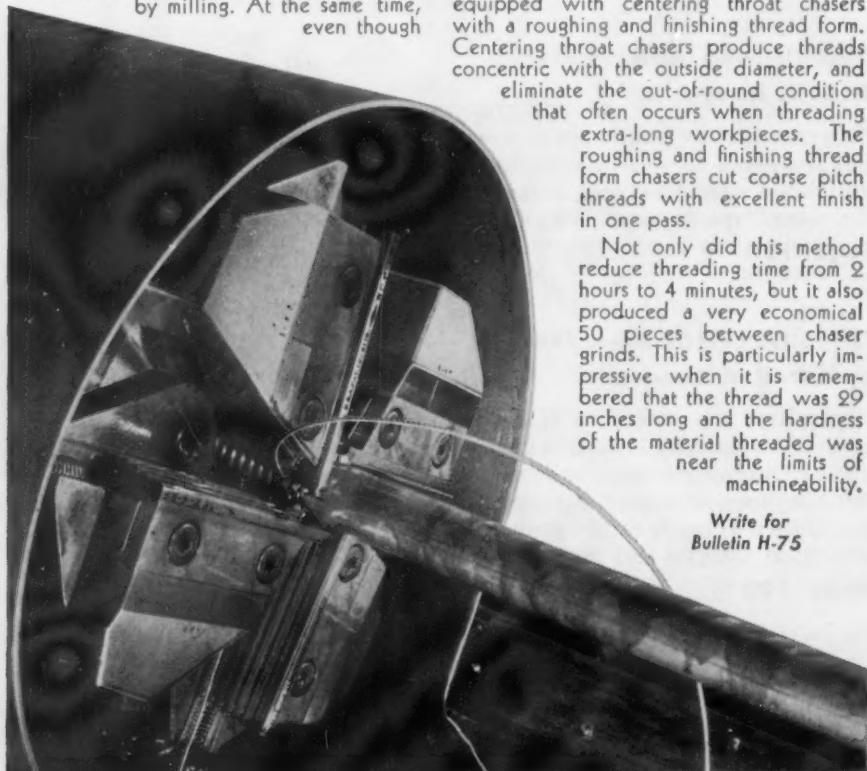
This contract required the cutting of a 1" diameter 5 pitch Acme thread 29" long on C1141 steel to a Class 3 fit. Original production plans were to generate the thread by milling. At the same time, even though

the specifications and the hardness of the material seemed to preclude other methods, we were asked if we could suggest a more efficient threading process.

Based on our recommendation after studying the thread specifications, a 1½" LANDMACO Single Head Leadscrew Machine with an extra-long carriage was installed. The LANCO threading head was equipped with centering throat chasers with a roughing and finishing thread form. Centering throat chasers produce threads concentric with the outside diameter, and eliminate the out-of-round condition that often occurs when threading extra-long workpieces. The roughing and finishing thread form chasers cut coarse pitch threads with excellent finish in one pass.

Not only did this method reduce threading time from 2 hours to 4 minutes, but it also produced a very economical 50 pieces between chaser grinds. This is particularly impressive when it is remembered that the thread was 29 inches long and the hardness of the material threaded was near the limits of machineability.

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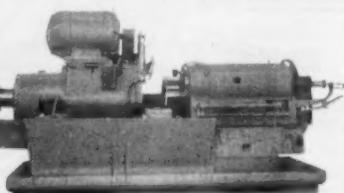


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2½"

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1½"
2½"

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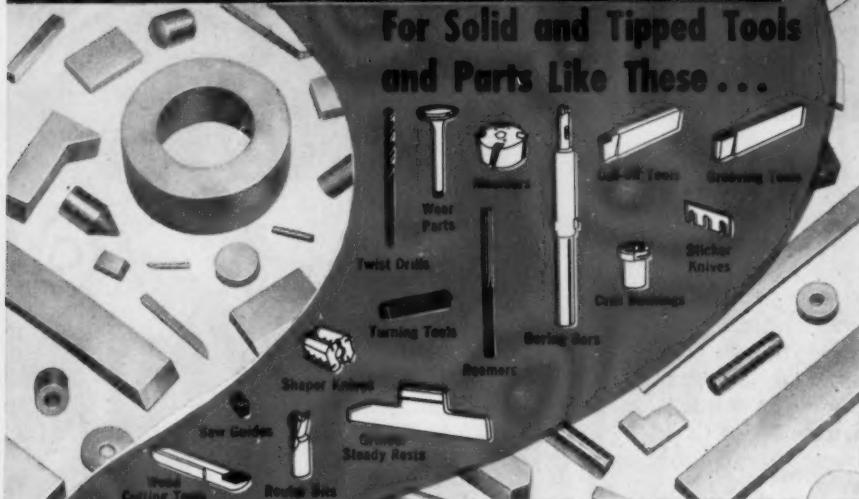
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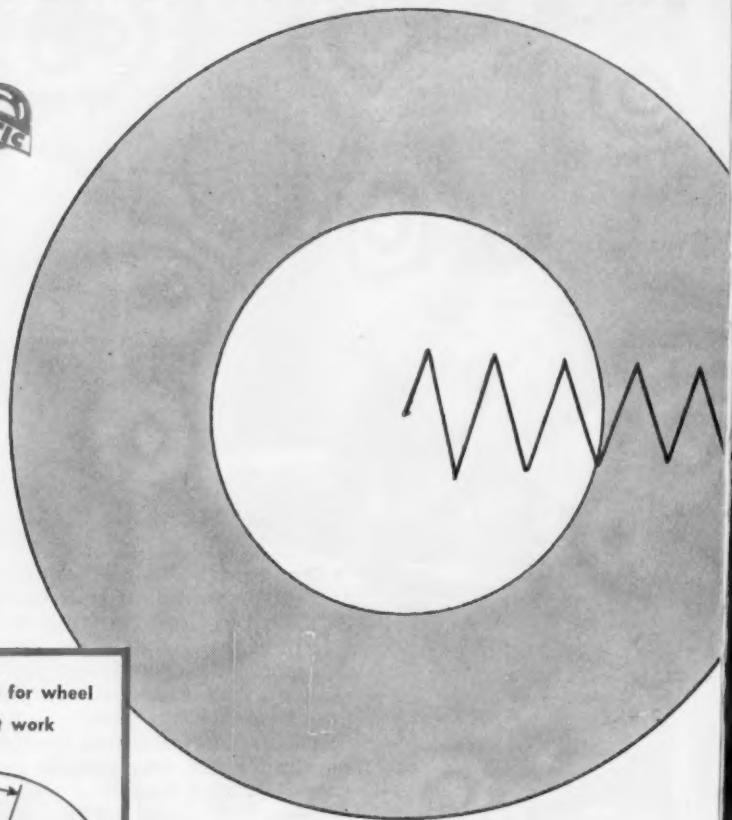
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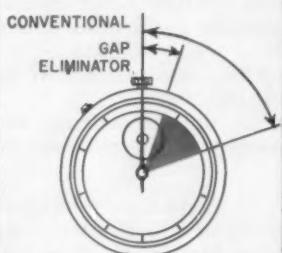
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Where Seconds



Time required for wheel
to contact work



Stop watch diagram
of cycle time saved by
CINCINNATI
GAP ELIMINATOR
on automatic infeed
grinding operations

GAP ELIMINATOR, Push-Button Automatic Infeed, Air-Electric Gage Sizing (with Cycle Time Stabilizer) and other cost-reducing features are included in the CINCINNATI FILMATIC 6" R x 18" Plain Hydraulic Grinder illustrated at the right. There are four sizes in the line:

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January, 1957

modern machine shop 11



9" column 3'-4' arms



9"-11" column 3'-4'-5' arms



13"-15"-17" column 4'-5'-6'-7' arms



19" column 6'-7'-8' arms



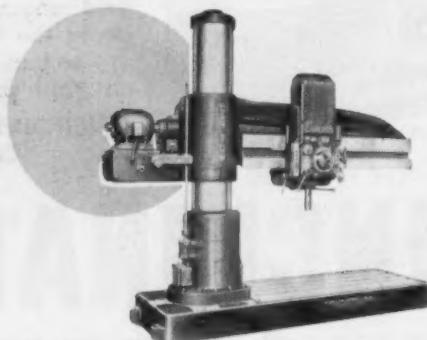
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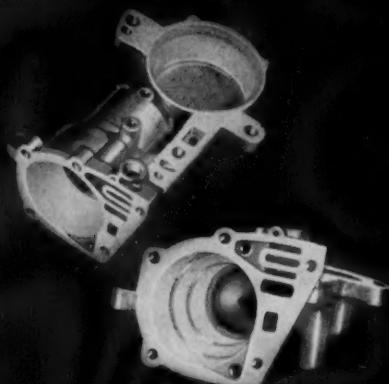
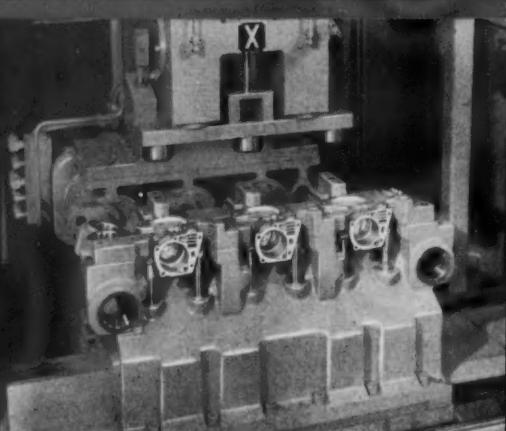
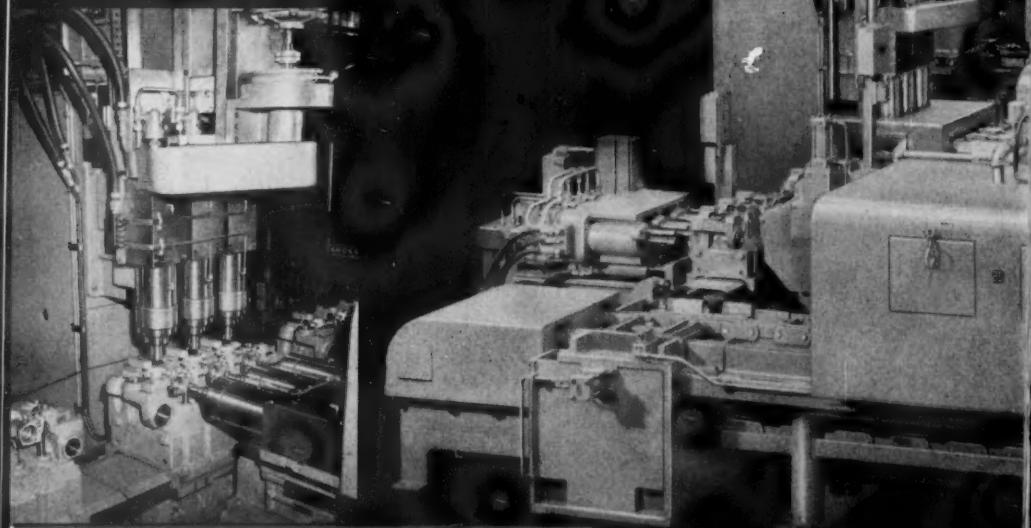
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modern machine shop

13

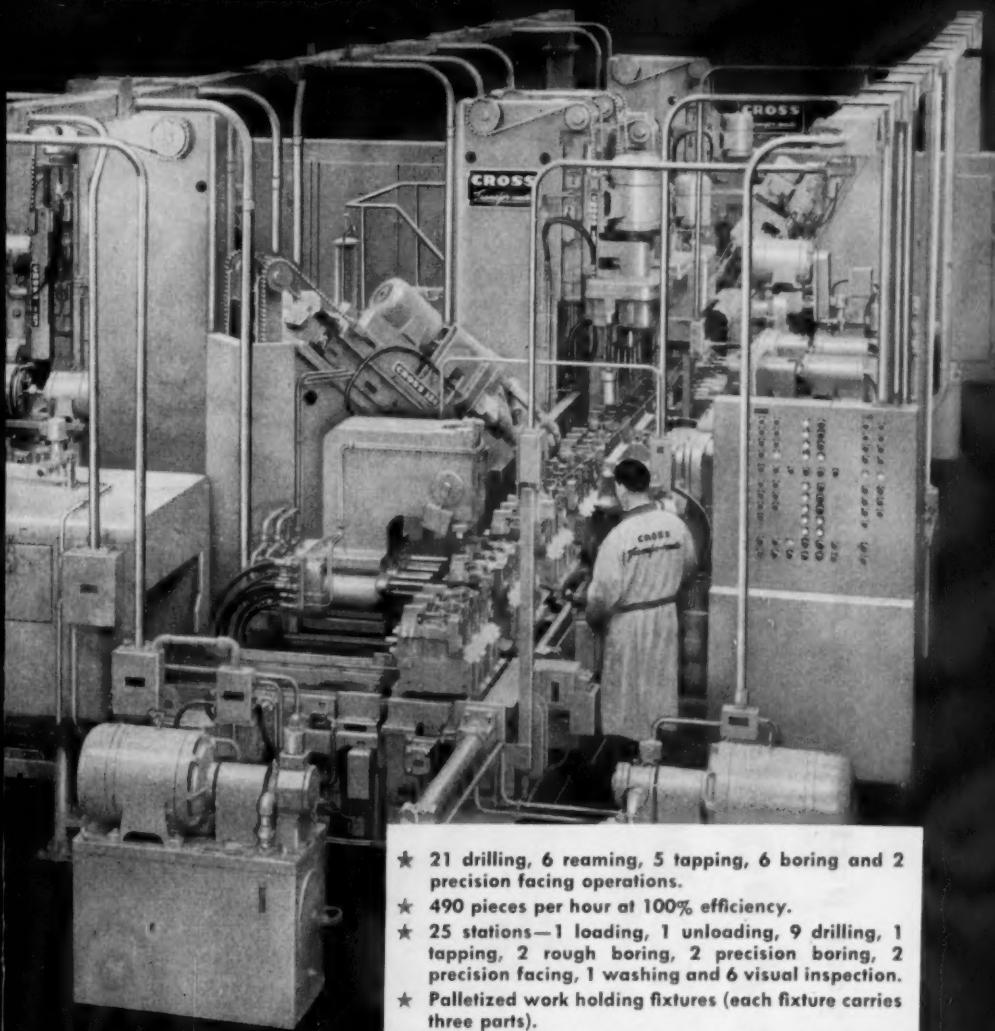
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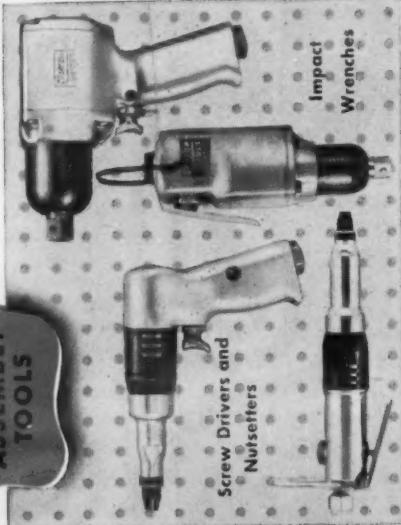
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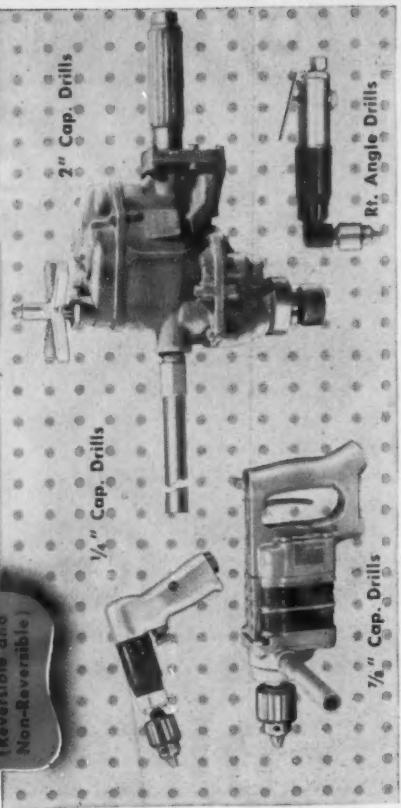
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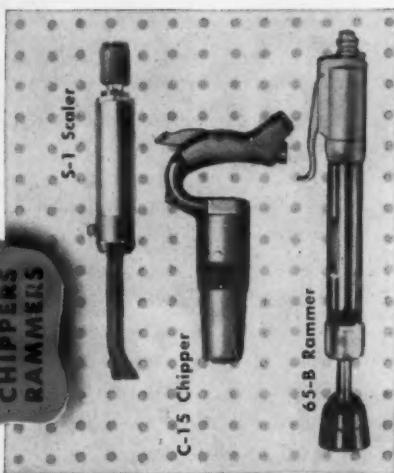
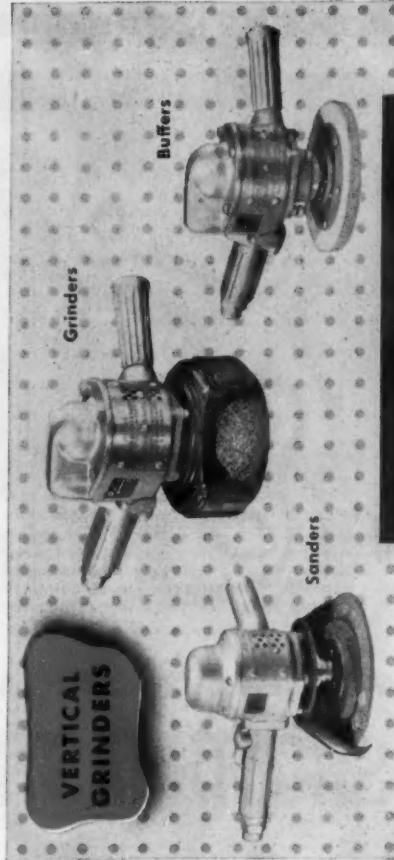
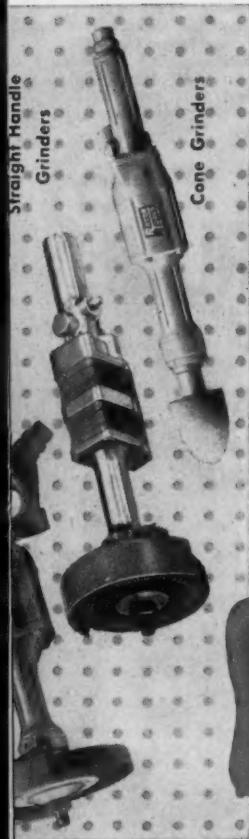
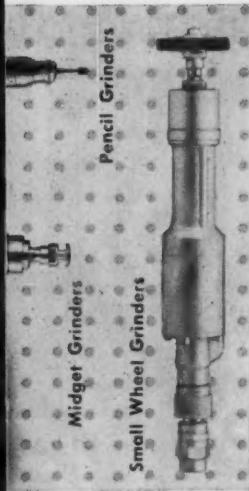
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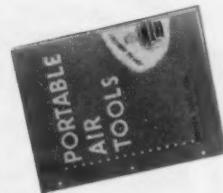
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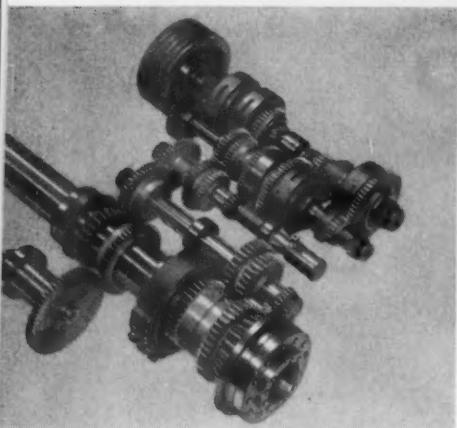
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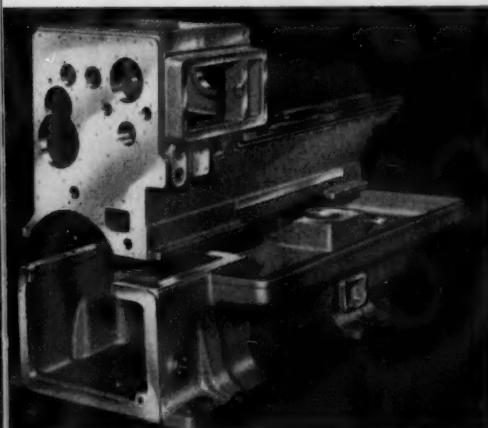
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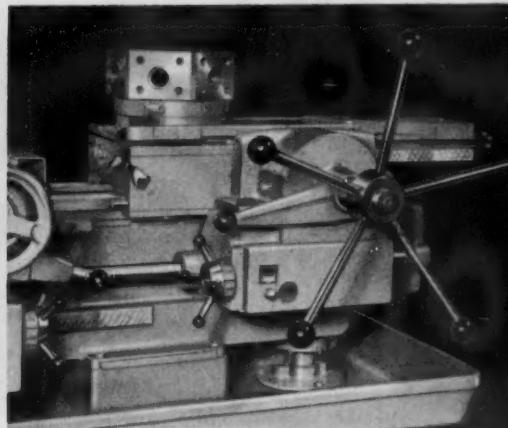
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- 200-4 and 200-7 HYD. VALVES
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COMPANY _____

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Wherever metal needs heat

LINDBERG knows how best to apply it



If you have any part in choosing the equipment or methods of applying heat to metal it makes sense to talk it over with Lindberg. The safest way to be sure that you have the right answer for any application of heat to industry is to consult the most widely experienced experts you can find. We believe we have them here at Lindberg. Our business is concerned only with the development of industrial heating equipment and we manufacture the most complete line in the field; heat treating furnaces, melting furnaces, high-frequency induction units, ceramic kilns; big ones, small ones, electric or fuel-fired, built in our plant or field-erected.

Lindberg is a world-wide organization, and through its subsidiaries abroad has available the latest developments in heat applications in

foreign industry. Over the years Lindberg research laboratories and its staff of furnace and process engineers have pioneered many of the most important developments in the industrial heating field, from the original Cyclone tempering furnace to the revolutionary new Induct-O-Ring shown and described below.

This design staff is ready to apply its experience to your requirements and recommend or create the equipment needed best to fulfill them, then thoroughly test the practicality of its recommendations through Lindberg's unique pilot plant operation. You can be sure you have the right answer when you leave it to Lindberg. So get in touch with your nearest Lindberg Field Representative (we have them in all major industrial centers) or write us direct.

Lindberg's Revolutionary New Induction Heat Treating Furnace

- For carbonitriding, bright hardening,
carburizing of small parts
- No elements, no burners ○ No fuel or electric
connections in furnace ○ Built like a
fine machine tool ○ Precise temperature control
- Very low maintenance
- Quiet, automatic, trouble-free

induct-o-ring*

LINDBERG
10000

*U. S. and foreign patents pending

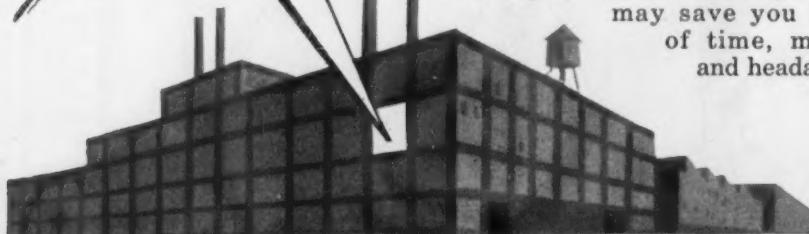
LINDBERG ENGINEERING COMPANY
2464 West Hubbard Street, Chicago 12, Illinois
Los Angeles Plant: 11937 S. Regentview Ave., at Downey, Calif.

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time to call a specialist

Things going haywire? Simply reach for the phone and call your nearest distributor for the skilled help of a Chicago-Latrobe Service Engineer. His highly specialized experience may save you a lot of time, money and headaches.



Chicago- Latrobe

Drills and Reamers



CHICAGO-LATROBE
419 W. Ontario St., Chicago 10, Ill.

OFFICES AND WAREHOUSES
NEW YORK • DETROIT
CHICAGO • LOS ANGELES

The stocks are large and the service is great from your local Distributor. Call him.



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"Real money-maker"—that's what our customers say about Nebel extension bed gap lathes.

"Saved \$15,000 a year on creative mill work."

"Returned a third of its purchase price in less than two years."

"Has stepped up production from 2,000 to 2,500 units of rough and precision pieces a year."

"Eliminated costly shutdowns which ran as high as \$1,000 per week."

Another customer chucks a complete 4500-lb. pump rotor on a large face plate, and swings it in the wide, deep Nebel gap, without taking it apart.

Here's why the Nebel extension bed gap lathe is the "money-making-est" lathe in the business: Built to complete A.S.A. Lathe Standards, it offers (1) the productive capacity of two ordinary lathes, (2) the precision performance of more expensive lathes and (3) the facilities of a vertical boring mill.

Made in three models and sizes — AG 20"/40" medium duty, G 28"/50" heavy duty and XB 20"/40" heavy duty—there's one that will fit your specific requirements exactly. Nebel also manufactures removable block gap lathes in three swing sizes and standard lathes in six swing sizes 16" to 36". For complete information, write for descriptive bulletins. Nebel Lathe Division, Nebel Machine Tool Corp., 3409-A Central Parkway, Cincinnati 25, Ohio.

GET THE CAPACITY OF TWO LATHES . . . WITH BUT ONE INVESTMENT



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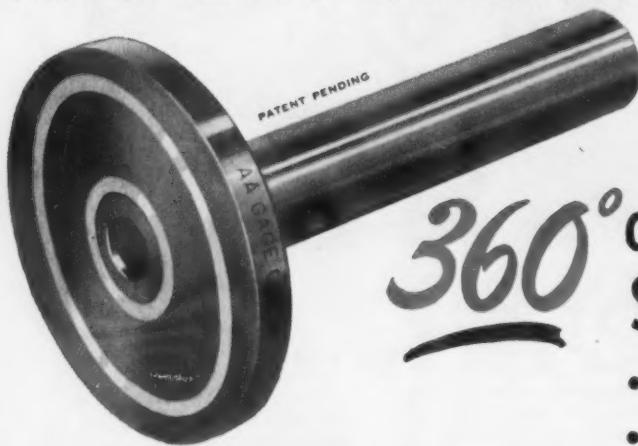
✓ CHECK SQUARENESS

NEW!

in seconds



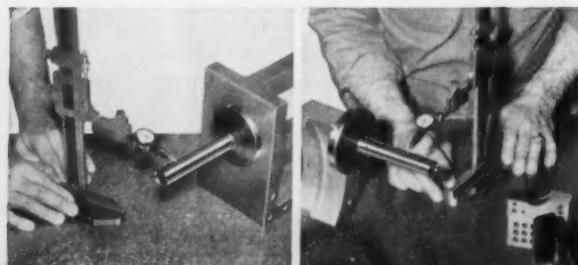
MAGNETIC CYLINDER SQUARE



360° OF ABSOLUTE
SQUARENESS

A POWERFUL MAGNET SECURELY HOLDS
THE FACE OF THE CYLINDER SQUARE TO
THE SURFACE THAT IS TO BE CHECKED.

- ELIMINATES DISTORTION AND TIME CONSUMING METHOD OF CLAMPING.
- YOU HAVE BOTH SPEED AND ACCURACY.
- CAN BE USED FOR ANY TYPE OF SQUARING OPERATION
- STURDILY CONSTRUCTED FOR HARD USE.
- RE-WORKING IS A SIMPLE PROCESS TO RESTORE ORIGINAL ACCURACY.
- MADE OF SELECTED STEEL TO INSURE STABILITY AND UNIFORMITY.



STANDARD SIZE:

Approx. 3 1/4" Dia. x 6" Long—\$48 F.O.B. Detroit
(Complete with Case)

ALSO AVAILABLE: 7 1/2" Dia. x 14" Long

AA GAGE COMPANY

350 FAIR ST., Dept. B
DETROIT 20, MICH.

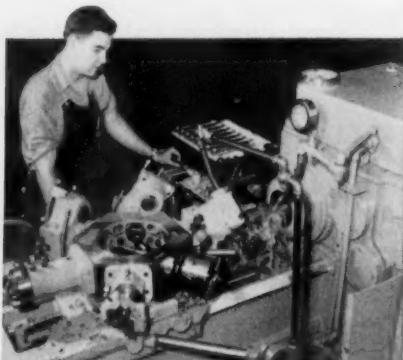
HERE'S REAL BREAD-AND-BUTTER PRODUCTION!



Warner & Swasey 1-A combines power and instantaneous speed changes with standard tooling for top efficiency on this small lot job.

The practical shop man knows that, after all the smoke has cleared about fancy attachments and special tools, most small lot work depends on his real "bread and butter" producer—the versatile, standard-tooled turret lathe.

And here's a typical small lot bar job, a 10-inch pinion shaft, that demonstrates this point. It requires the flexibility of standard tooling, power to really hog metal, and a fast selection of the most efficient cutting speeds. A new Warner & Swasey 1-A Extra Heavy Duty Turret Lathe, equipped with standard tools, does the job in 4½ minutes—real metal turning efficiency!



YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY

For more data circle 224 on Reader Service Card

January, 1957

modern machine shop 27

It requires a variety of cuts with 7 speed changes. The 1-A's 16-speed, all-clutch head, with its pre-selector, delivers them instantaneously!

First cut in this high carbon steel shaft is taken with a standard single cutter turner, using a carbide cutter. It is ½-inch deep and consumes 30 horsepower! Second and third turning cuts are also taken with single cutter turners, using cutters with mechanically-held, throw-away carbide tips.

Two speed changes are made during the cutoff operation, again showing the advantage of instantaneous speed changes under cut, without effect on the carbide cutter.

Traditional Warner & Swasey ease of machine handling, enhanced by the new hydraulically-operated collet chuck and bar feed, not only cuts cycle time but cuts operator fatigue—puts more pieces on the floor at the end of each day!



*Pioneered by Covel
and first introduced
at the 1947 Machine
Tool Show. Available
on all Covel surface
grinders.



Save Re-scraping...Save Money! with COVEL HARD CHROME TABLE WAYS*



COVEL No. 10 SURFACE GRINDER 6"x18" Hand or Power Feed

Engineered to give you the most accurate gage, form tool and surface grinding performance at low initial cost. Smooth timing belt drive, hardened and ground lead screws and rigid vertical slide insure precision operation.

Hard Chrome Table Ways Reduce Maintenance Costs

This Covel introduced feature preserves the built-in accuracy of hand-scraped ways for extra years of precision service.



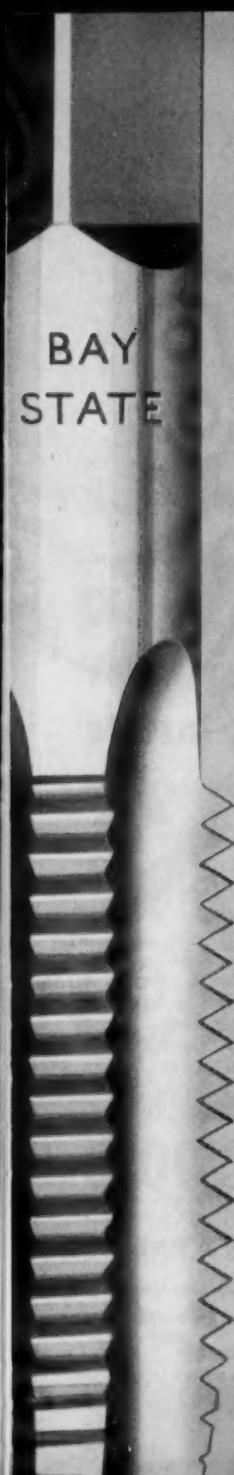
Write for FREE BULLETIN

For all the facts about the rugged low cost Covel No. 10 write DEPT. MM-17.



THE MOST COMPLETE LINE OF SURFACE GRINDERS • UNIVERSAL CUTTER & TOOL GRINDERS • DRILL GRINDERS • OPTICAL COMPARATORS

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A DIRECT LINE TO TAPS

FROM YOU TO THE
WELL-STOCKED SHELVES
OF YOUR NEARBY
INDUSTRIAL SUPPLY DISTRIBUTOR...
BAY STATE, OF COURSE!

BAY STATE TAPS

BAY STATE TAP & DIE COMPANY
MANSFIELD, MASSACHUSETTS



The Best Dressers have Colmonoy-set Diamonds

The big difference in diamond wheel dressers is the kind of diamond setting material used. D & T diamonds are set in a Colmonoy alloy, one derived from the Colmonoy hard-facing alloy line.

Colmonoy grips the stone better, dissipates dressing heat quicker, and has a coefficient of expansion closer to the diamond itself, than any other material. Write for the Diamond Tool Catalog.



DT-2 is an example of a D & T Colmonoy-set single point dresser. Shank dimensions and diamond weight and quality to order.



C-7X is a popular multiple-cluster dresser carrying seven medium-grade diamonds in a Colmonoy setting. Price, only \$18.75.



IC-4 is an impregnated diamond dresser. Many small whole diamonds within a Colmonoy matrix make a rugged, heavy-duty tool.

Colmonoy Center Tips Last 7 Times Longer



Apply Colmonoy center tips to worn lathe and grinder centers, and Colmonoy blade tips to centerless grinder rest blades. They'll outwear steel many times over. Just silver solder in place. All popular sizes in stock. Write for Form DT-11.

ATTENTION DEALERS

You can profit by selling the D & T line of wheel dressers and wear resistant castings. Write for more information.

Colmonoy Wear Strips and Chuck Jaw Inserts



Reduce the cost of chuck jaws and wear strips—make them last longer with castings of Colmonoy. Jaw inserts shown last three times longer, wear strips give from three to six times longer life than other materials. Send prints for quotation.

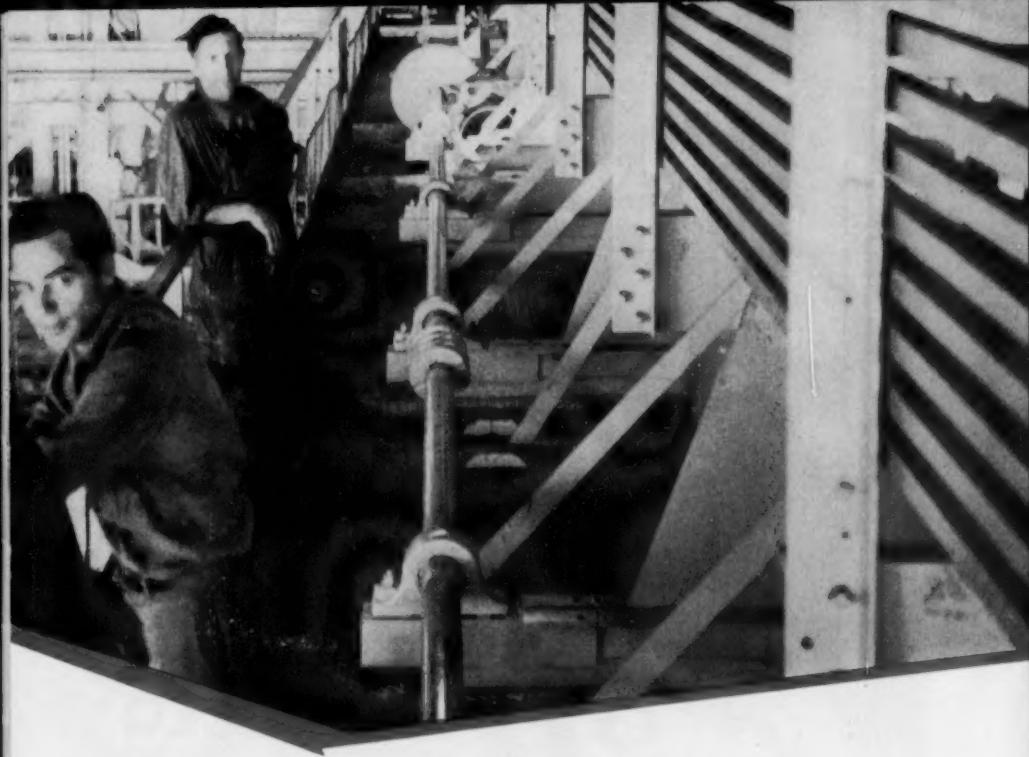
DIAMONDS & TOOLS INCORPORATED

19345 John R Street • Detroit 3, Michigan

An Affiliate of Wall Colmonoy Corporation

Manufacturers of Superior Hard-Facing and Brazing Alloys

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here's how Bearings, Inc. cuts the overhead on overhead cranes

This 30 ton crane with a 95 foot span was so inefficient it lost many hours of work every month. The Bearings, Inc. engineer recommended a complete conversion to anti-friction bearings and showed plant management how easily and inexpensively the conversion could be accomplished.

We supplied all bearings, seals, housings, and caps for 16 bridge wheel bearing journal boxes. The drive motor was converted to roller bearing end bells.

Main drive line shaft from the motor to the wheels was converted to roller bearing pillow blocks. An adapter on the wheel axle eliminated machining. The only additional work needed was to weld a plate with bolt hole under the crane frame where units were mounted.

Crane now starts under load at first contact point on control and is the fastest crane in the plant. Crane was pulling 350 to 400 amps.; now uses less than 200 amps. Crane operator

withdrew a request for transfer to another crane after conversion was completed.

Do you have a slow moving, inefficient crane in your plant? Ask our branch nearest you to show you how it can be converted to a fast, efficient piece of equipment at a minimum expense. Call or write NOW.

*Rendering bearing service in the territories
adjacent to our branches, listed below.*

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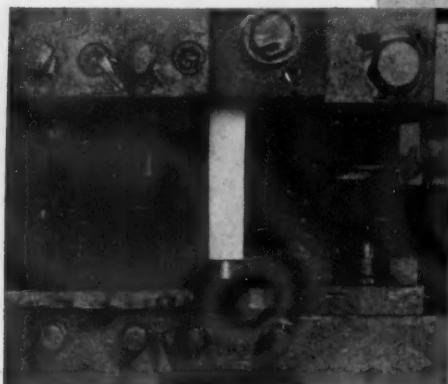
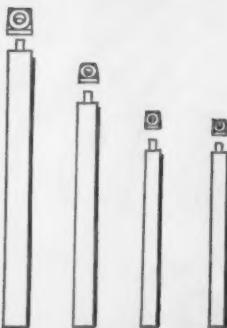
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NEW JERSEY: Camden • **MARYLAND:** Baltimore

Subsidiaries: Balanol Corp. • Buffalo, N.Y. •

Kentucky Ball and Roller Bearing Co. • Louisville, Ky.



Looking down on the SAGAMORE high speed cold nut punch in horizontal press.

**Write for your
SAGAMORE BLUE SHEET**

This four page report was compiled from data collected in laboratory and field tests. Included is complete information on applications, physical characteristics, forging, annealing, hardening, tempering, etc. Ask for your copy.

ADDRESS DEPT. MS-85



For complete MODERN Tooling, call
Allegheny Ludlum

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**A-L CUSTOMER
FINDS**

SAGAMORE PUNCHES

**BEST
IN TOOL-COST
STUDY**

An A-L customer tested various tool steels to determine the best for his varied cold-punching operations. SAGAMORE, a new air-hardening, non-deforming die steel was the ultimate choice. Here's why:

- Using SAGAMORE cold-drawn stock eliminated the need for finish-grinding the punches.
- Punches of SAGAMORE outperformed those of carbon-vanadium steel three to one.

The SAGAMORE punches were hardened by heating in a salt bath to 1750°F. and air cooled. They were then given a double draw at 1110°F. The resulting Rockwell hardness was 51C.

Characteristics of A-L SAGAMORE are: Excellent non-deforming properties, unusual toughness, lower hardening temperatures, and easier machining and grinding. These, plus the comparatively low cost, make it a good selection for this type of application.

For assistance with your tool or die steel problems, call your local A-L representative or distributor, or write Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.

For nearest representative,
consult Yellow Section of your telephone book.



♦ Use this Reader Service Card for requesting more information on products described and advertised.

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January 1957 Issue

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modern machine shop

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Cincinnati 2, Ohio

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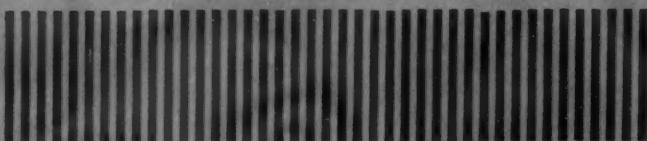
machine

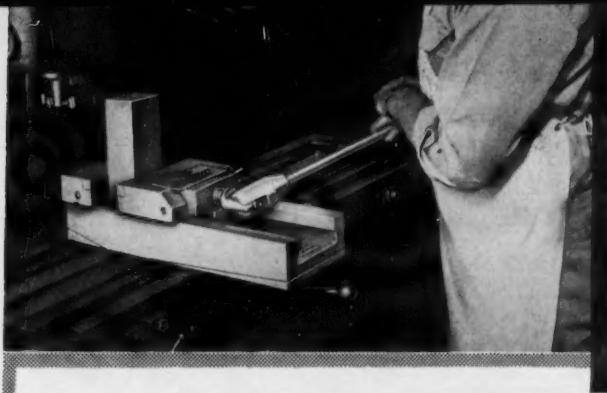
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VILLAGE STATION

NEW YORK 14, NEW YORK





LARGE CAPACITY
HALF THE WEIGHT
MULTIPLE CLAMPING
POWER
FULLY ADJUSTABLE

New swivel milling vise

the only swivel vise that mounts flat on table . . .

The New J & S CLAMPCUT Milling Vise multiplies the clamping and holding power expected of a milling machine vise. The powerful Acme threads tighten the adjustable jaw head and the patented down holding clamping jaws multiply the pressure.

Engineered and designed for full efficiency with a minimum of weight, nothing is wasted—no part is non-functional. Many times the holding power of an ordinary vise, yet only half the weight.

EASY TO USE
SNAPS TO WORK —
then tightens
READILY
DIS-ASSEMBLED
REVERSIBLE JAWS

A quick-release taper swivel provides positive clamping in position with only two "T" bolts. The swivel is calibrated for full 180°.

This fast loading vise is provided with exclusive "snap-on" parallels that cannot be clogged with chips.

Holds round pieces in vertical position and has adjustable stop for repeating operations quickly and accurately.

J & S CLAMPCUT Vises come in two sizes for 12" capacity and 8" capacity. Write for complete details and prices.

Quick finger release for setting and resetting any position for full range of vise.

Distributors in all industrial areas.



WHEEL DRESSERS **J & S**
TOOL CO., INC. JAW CLAMPS • PRECISION VISES • DOWN HOLDING DEVICES

J & S TOOL CO., INC.

CLAMPCUT ONE SIZE

871 DORSA AVE.
LIVINGSTON, NEW JERSEY

Never Confuse the No. 8 MARVEL with an ordinary Band Saw

...only the MARVEL is Universal



Only on a No. 8 MARVEL can the saw column be instantly indexed and locked at any angle from 45° right to 45° left, and the saw then fed thru the work at the desired angle — without moving the work.



Only a No. 8 MARVEL can do all of these things: Snip-off a 1/8" rod or cut-off an 18" x 18" cross section.



Rough to Size and Shape



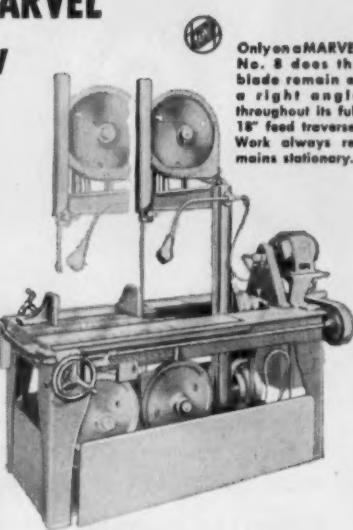
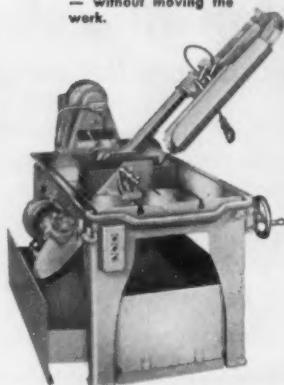
Miter



Index



Cut off and shape Structural Beams



Only a No. 8 MARVEL has the large T-slotted worktable, with removable quick action vise, that permits accurate set-ups of work of unrestricted sizes and shapes, special fixtures; Etc.

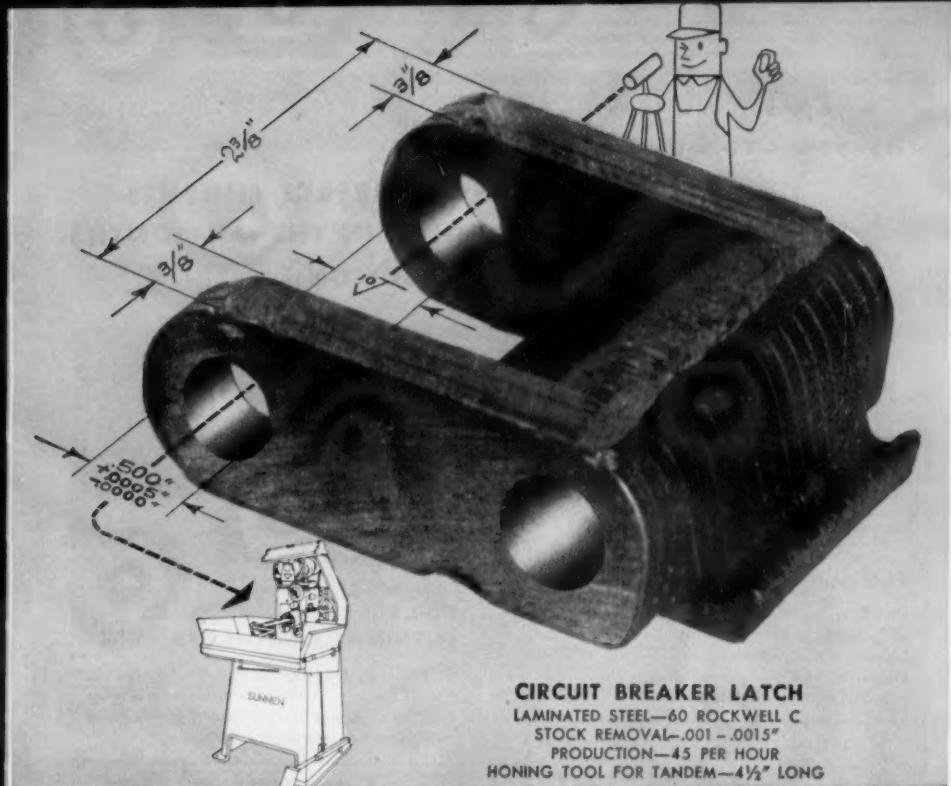
"Rough Machine" to size and shape with minimum chip waste

The No. 8 MARVEL is the "busiest tool in the shop" wherever installed because it is a *universal* tool—has both the capacity and the versatility to handle not only standard sawing jobs but innumerable "trick" and convenience jobs as well. More than a metal saw, the No. 8 MARVEL is a fine machine tool with machine tool features like: Both power and hand feeds; Depth Stop; Automatic Blade Tension; Built-in Coolant Pump; Three operating speeds (or six with 2-speed motor). Moisture-proof electrical controls that conform to both "J.I.C." and "MACH-INE TOOL" electrical standards; Dirt-proof ball bearings, etc.

If you cut, machine or fabricate metal, this is a sawing machine you should know about. Write for catalog.



ARMSTRONG-BLUM MFG. CO. • 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.
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HOW TO ASSURE ALIGNMENT OF TANDEM BORES

Tandem bores are often a problem: Boring or grinding from one side requires a long quill or bar which tends to spring, jump and chatter.

If you bore or grind from both sides, turntable error, wear or unequal stock removal can upset alignment. Reaming, too, can give you problems with tolerances, finish and alignment.

Your answer is Sunnen Honing! It assures perfect alignment, size and finish every time...for tandem and multiple-land bores.

Reason: The spaced lands are all honed simultaneously...by a honing tool of sufficient length. The holes are self-aligning on the long honing tool.

No fixtures or turntable...no clamping distortion or tool deflection...no side pressure or tool chatter.

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GET ALL THE FACTS ON SUNNEN HONING

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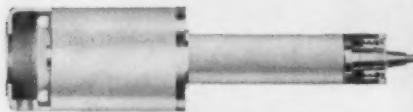
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why you can be sure of...

- LOW MICROINCH SURFACE FINISHES
- TOLERANCES DOWN IN THE MILLIONTHS
- INCREASED PRODUCTION
- LOWER COSTS

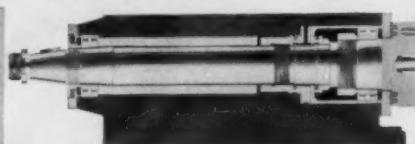
when you specify . . .

POPE PRECISION SPINDLES



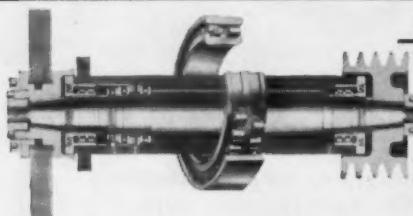
FOR SURFACE GRINDERS—

POPE 1, 2 and 3 HP, Totally Enclosed 1800 and 3600 RPM Motorized, Cartridge Type Spindles with massive shafts and big, double row cylindrical roller bearings having enormous capacity, superior performance and long life.



FOR BORING ROUND HOLES WITHIN MILLIONTHS OF AN INCH

POPE Heavy Duty Boring Spindles for smooth, chatter free, continuous high production of accurate parts. Again, look at the big cylindrical roller bearings and thrust bearings.



FOR CYLINDRICAL GRINDING—

POPE Cartridge Type and Wheel Head Belt Driven Spindles with the capacity to produce more work whether you plunge grind with a crush dressed wheel, remove surplus metal, or produce low microinch surface finishes. Note the super-precision radial bearings and ball thrust bearings.

FOR HEAVY DUTY MILLING—

POPE Spindles have the double row cylindrical roller bearings for the extra rigidity to support the cutting tool, and the double direction thrust bearings with the excess capacity to stabilize the shaft against endwise movement in either direction. This adds up to longer cutting tool life, more production, lower cost per piece.

POPE engineers and builds standard and special, precision anti-friction bearing Spindles for every purpose. Send us your specifications for prompt quotations.

No. 115

Specify

POPE
PRECISION SPINDLES

POPE MACHINERY CORPORATION

Established 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS

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Automobile Manufacturer produces

Repetitive Pieces to Close Tolerances with

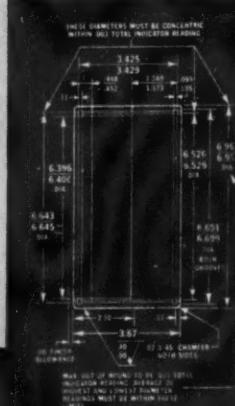
BULLARD

MULT-AU-MATIC Type "L"



At one of the nation's largest automotive plants, a number of Bullard Multi-Au-Matics, Type "L" are employed to produce automatic transmission parts. According to the Process Engineer "The transmission is the most precision piece of equipment in the entire car — with many moving parts fabricated to close tolerances."

If you have need to manufacture to exacting tolerances it will pay you to investigate the many advantages offered by Bullard Multi-Au-Matic, Type "L".



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THE BULLARD COMPANY

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NEW MULT-AU-MATIC, TYPE "L" CATALOG

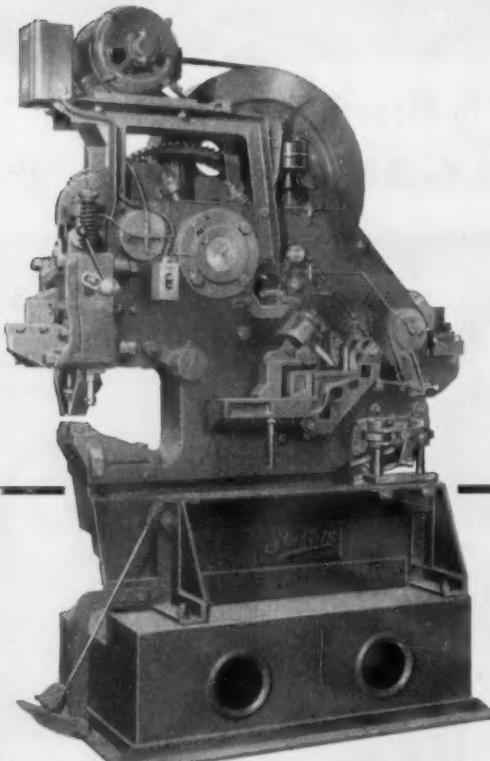
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**PAYS FOR
ITSELF
IN A HURRY**

**—AND IT'S
BUILT TO LAST!**

CUTS
PUNCHES
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SHEARS
SLITS
COPES
MITERS
without changing tools!

"BUFFALO" UNIVERSAL IRON WORKER

Yes, here's one machine to do all these metalworking operations in your shop—as many as 3 at one time! Built to take years and years of punishment, too, with its rugged electrically welded steel plate frame and 1-shot lubrication system. Thousands of users have found it the most useful machine in their shops. Write today for Bulletin 360—see the angles, tees, channels, bars and flats it will handle for you—fast!



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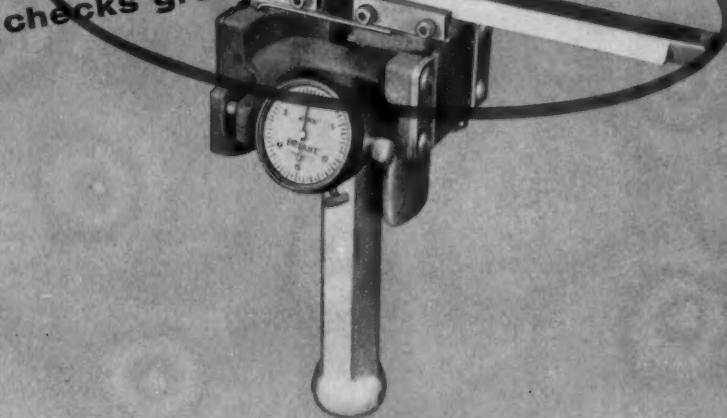
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BRYANT GROOVE GAGE

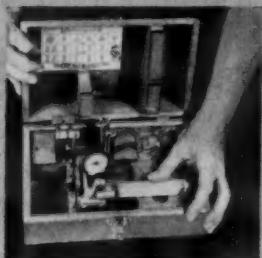
checks grooves up to 13" in diameter!



The Bryant Groove Gage gives you fast, accurate inspection at low cost. With long segments, as shown, you can measure grooves up to 13" in diameter.

The standard Bryant Groove Gage kit includes four pairs of segments to check "0" ring grooves through 5" dia. and four pairs of segments to check snap ring grooves through 5" dia. Immediate delivery from stock.

Also available: Bryant bench gages to measure internal threads, external threads, concentricity and squareness of face, and portable gages for checking internal threads. Write for complete information.



Bryant Gage & Spindle Division

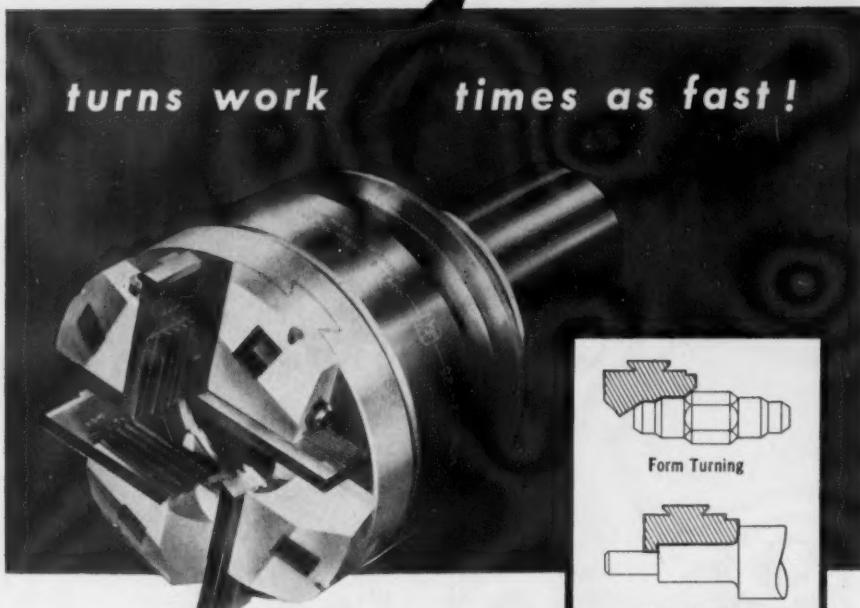
P. O. Box 620-D, SPRINGFIELD, VERMONT

Division of Bryant Chucking Grinder Company

For more data circle 236 on Reader Service Card

Die Head HOLLOW MILLING

turns work times as fast!



In most cases, hollow milling chasers in J & L Die Heads will do plain turning, multiple turning and contour forming four times faster than any single point tooling method. (Each of the four chasers in the set does the work of a single point tool.)

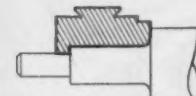
Important!

Money-saving hollow milling chasers are held in the same J & L Die Heads that guarantee Class III threads — every time.

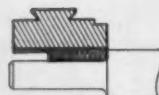
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Form Turning



Multiple Turning



Turn and Face with Carbide

Carbide chasers in J & L Die Heads have reduced hollow milling time still another 80% over H.S.S. chasers, while holding surfaces to 10 RMS.

JONES & LAMSON

JONES & LAMSON MACHINE COMPANY, 521 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

For more data circle 237 on Reader Service Card

40 modern machine shop



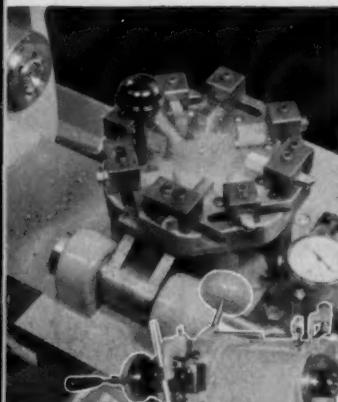
*Class III Guaranteed
Not Sometimes, but Everytime!*

THREAD TOOL DIV.

January, 1957

HARDINGE
ELMIRA, N.Y.

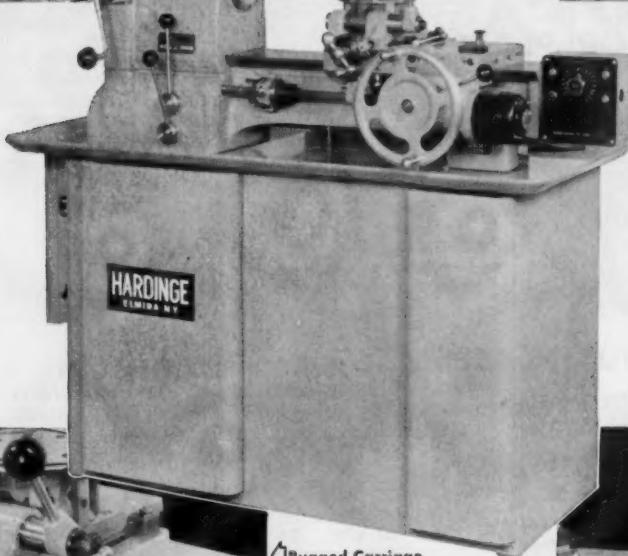
"Closer Tolerances Increase Demand for the HARDINGE HCT Precision Chucking Machine"



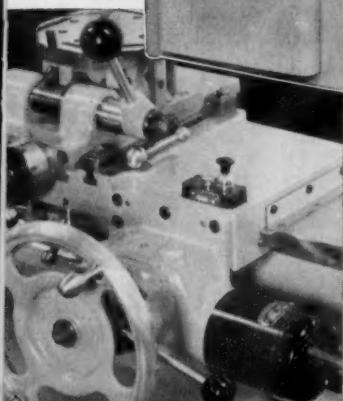
8-Station Turret

Flexible Range of Operation

High Speed Precision
Chucking Machine
Model HCT



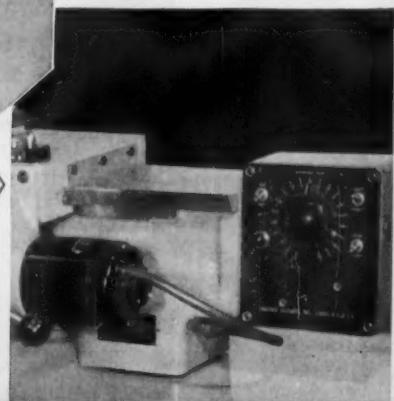
Hardinge Model HCT
Precision Chucking Machine
finishes diameters, recesses,
shoulders, back faces,
front faces, and
cuts precision threads
in one setting - all concentric
with each other.
Tooled inexpensively with
standard tool bits.



Rugged Carriage

Independent Variable
Carriage Feed

For complete
information
write for
Bulletin HCT

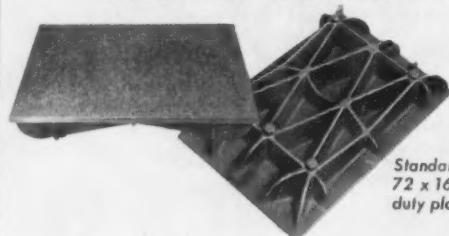


HARDINGE BROTHERS, INC., ELMIRA, N.Y.
"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

Today's Standard in Precision Surfaces

MACHINE PRODUCTS

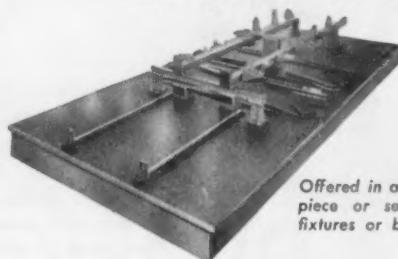
SURFACE PLATES . . .



Standard sizes from 7 x 7½ to
72 x 168. Extra large and heavy
duty plates also available.

Specially heat treated cast iron to eliminate distortion and to insure dimensional accuracy . . . triangular rib supported to resist load deflection . . . finished to exacting precision specifications . . . ample top thickness to permit resurfacing operations.

FLOOR PLATES . . .



Offered in any size up to 10' x 20' in one
piece or sections. Quotations on plates,
fixtures or both furnished on request.

May be utilized for either layout or fixtures . . . features an adjustability of .002" in any direction . . . offers the convenience of 2" clamping ledges on both sides and ends. And, if desired, cast iron plates can be furnished with machined scribed lines.

LAYOUT PLATES . . .



Designed to facilitate layout work . . . flawlessly surfaced to meet today's precise requirements in inspection . . . ruggedly constructed to permit mounting of unit heads for machining operations.

Facilities also available to recondition worn equipment to your "specs."

Free!

Catalog containing descriptions, specifications
on Machine Products plates and accessories.

Standard sizes: 36 x 72,
36 x 96, 36 x 150.
Other sizes on request.



MACHINE PRODUCTS Corporation

6771 E. McNICHOLS ROAD • DETROIT 12, MICHIGAN

For more data circle 239 on Reader Service Card

Now... available in 6 models

in both regular and non-magnetic types

The amazing *New*

CHECK

MASTER

TEST INDICATOR

THAT RESPONDS TO DIMENSIONAL VARIATIONS OF
.000020" ... AND REPEATS WITHOUT VISIBLE ERROR



Model 32
Graduated .0005"
Range .016"



Model 34
Graduated .0001"
Range .008"



Model 31
Graduated .001"
Range .016"



Model 22
Graduated .0005"
Range .016"



Model 23
Graduated .001"
Range .016"



Model 24
Graduated .0001"
Range .008"



STANDARD

- for . . . use on all types of fixtures.
. . . surface plate set-ups.
. . . truing of pieces on machines.

They're here! Six . . . new Check Master test indicators, incorporating all the advance-engineered features you asked for.

To mention a few . . .

- ✓ High sensitivity that responds to dimensional variations of .000020" — coupled with the ability to repeat without visible error.
- ✓ All bearings jeweled for longer service life.
- ✓ Ease of repair and maintenance — only 3 moving parts.
- ✓ An All-Purpose Model that gives you both a .0001" and a .001" indicator — in a single instrument — simply by changing the contact point.

Model 24
Graduated .0001"
Range .008"

Model 26
All-Purpose*
(Shown with long,
contact point.)

Write for descriptive bulletin — or better still, talk to your Man from Standard about your specific Check Master requirements.

Available in both regular and non-magnetic models, with 1 1/8" or 1 3/4" dials. Graduated in .0001", .0005" or .001", with a range of .008" or .016".



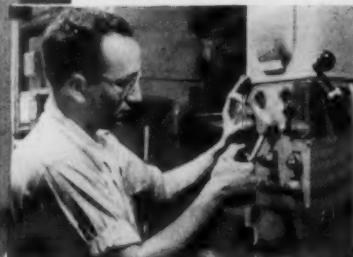
STANDARD

S I N C E 1 9 2 5

Gage Company, Inc.
154 Parker Avenue • Poughkeepsie, New York

A complete line of Indicating . . . Fixed and Adjustable Limit Gages

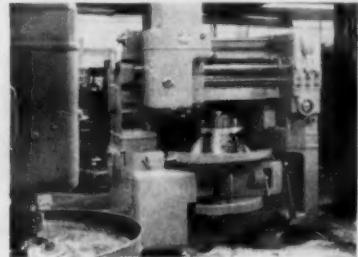
CUTS COSTS



Quick change cuts costs on short runs: at Silent Hoist & Crane Company, Brooklyn, N. Y., for example, 25 seconds is all the time needed to change cutter speed, depth of cut and rotary feed for different sized sprockets.



Five times faster than the machines they replaced on a variety of jobs, 36-Type Gear Shapers set many cost-cutting records at New Process Gear Co., Syracuse, N. Y. Part shown cut in one operation. Rate: 135 finished per day.

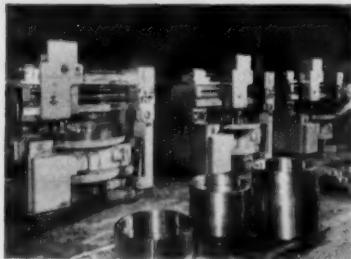


Faster on gears up to 36" P.D., two 36-Type machines replaced five older machines at Samuel M. Langston Co., Camden, N. J. 22.250" P.D., 4 D.P. steel spur shown is cut in 2½ hours. Production time on previous machine—10 hours.

THE
PRECISION
LINE

5 WAYS

FELLOWS 36-TYPE GEAR SHAPER



Heavy cutting power: 36-Type Gear Shaper removes 93 cubic inches of stock (26 lbs.) from the blank in just two cuts to make this 25.2" P.D., 3 D.P. gear at Fairfield Manufacturing Co., Lafayette, Ind. Total time: 258 minutes.



More efficient small gear cutting, too: 57 minutes is all it takes to cut each hand of this 6.486" P.D., 5/7 D.P.; 23° H.A., herringbone pinion at Snow-Nabstedt Corporation, Hamden, Conn., on their 36-Type Gear Shapers.

Here's the way to lower gear production costs even though over-all costs keep rising! These major firms (and many others) have proved that fast, accurate Fellows 36-Type Gear Shapers have the power, speed and versatility to cut production costs . . . often by more than 50%!

Set-ups are fast and simple for a wide range of jobs up to 36" P.D. Cutter speeds from 18 to 300 strokes per minute are available through a selector dial. Four rotary feeds are available through a feed lever, additional feeds through two pick-off gears. Semi-automatic fixtures may be used to decrease loading time.

Whether for long runs or many varied jobs, the powerful, versatile Fellows 36-Type Gear Shaper can very probably lower *your* gear production costs. Your Fellows Representative can give you valuable facts and figures about the benefits of investing in the Fellows Precision Line of gear production equipment. Write, wire, or phone any Fellows office.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices: 1048 No. Woodward Ave., Royal Oak, Mich.
150 West Pleasant Avenue, Maywood, N. J.
5835 West North Avenue, Chicago 39
6214 West Manchester Avenue, Los Angeles 45

Fellows Gear Production Equipment

For more data circle 242 on Reader Service Card

WIEDEMANN
TURRET PUNCH PRESSES

equipped with

**DIRECT MEASURING
GAUGE and TABLE**



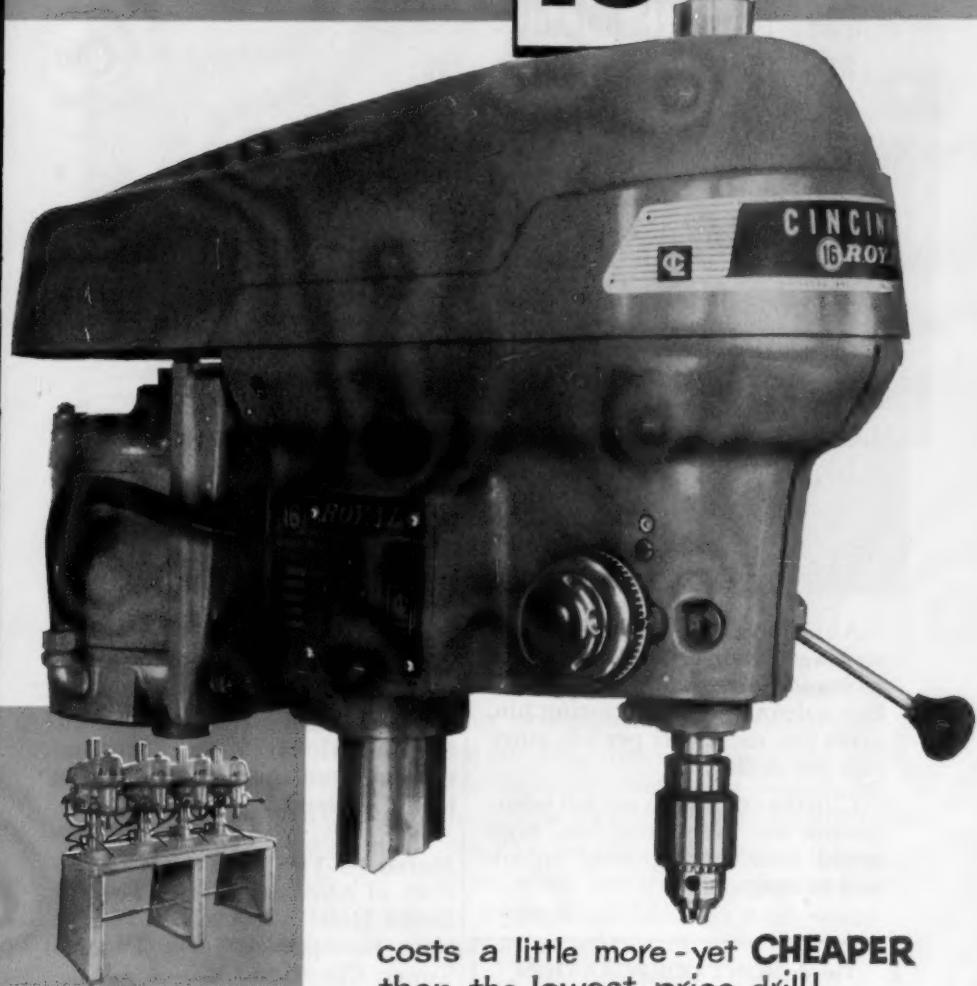
*the ONLY Flexible Method of Locating
and Piercing Holes of Many Sizes
in LARGE WORK in ONE HANDLING*

Write for Bulletin No. 500 D.M. Today

WIEDEMANN MACHINE COMPANY
4219 Wissahickon Ave. • P.O. Box 6794
Philadelphia 32, Pa.

For more data circle 243 on Reader Service Card

cincinnati 16" royal



Cincinnati Royal Drills are built in 16" and 18" sizes in bench, floor and multiple spindle models.

Also builders of 16" Sliding Head Bench and Floor Drills, 21" Sliding and Stationary Head Floor Drills, 3-7/8" Radial Drills, and Cincinnati "Tray-Top" Lathes.

costs a little more - yet **CHEAPER** than the lowest price drill!

Yes, the new Royals are cheaper, because they stay accurate longer, stay on the job longer. They're **metalworking** drills, built by machine tool builders to machine tool standards.

For long-run economy, replace with the new Cincinnati Royals. Contact the CL&T dealer in your area. He will give you full details . . . often is able to make deliveries from stock.

For catalog data, write Cincinnati Lathe and Tool Co.,
3207 Disney St., Cincinnati 9, Ohio.

center on



cincinnati lathes and drills

duMONT PERFECTS BALANCE --ADDS TO TOOL BIT LIFE



WEAR RESISTANCE
TOUGHNESS
RED HARDNESS



An almost perfect balance of toughness, wear resistance and heat resistance gives duMONT Tool Bits a definite edge in cutting life, gives you more cuts per bit, more cuts per dollar.

Clip the coupon to get full information on these long-life, high speed tool bits, ground square and rectangular.

The duMONT CORPORATION,
Greenfield, Mass.

MAIL FREE Tool Bit COMPARISON CHART, CATALOG and PRICE LIST S to

Name

Company

Address

For more data circle 245 on Reader Service Card

Meetings

Important Meeting Dates

* * * * *

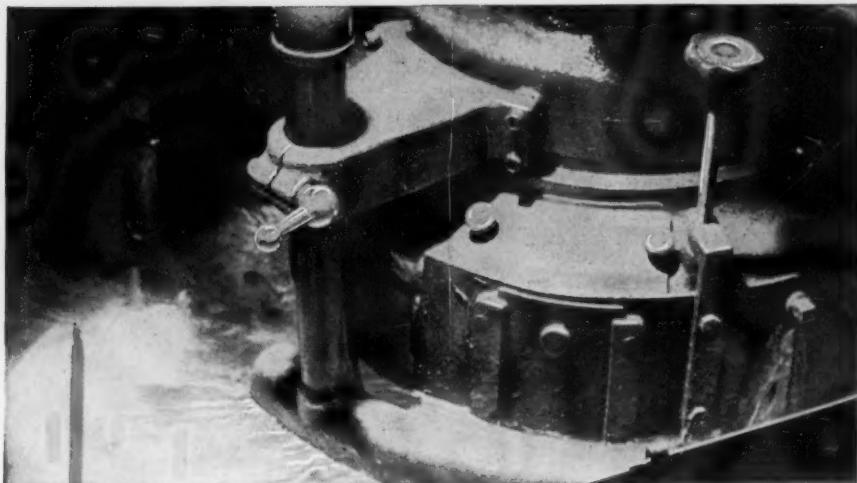
January 28-31 • Plant Maintenance and Engineering Conference and Show, Public Auditorium, Cleveland. Information: Clapp & Poliak, Inc., 341 Madison Ave., New York 17, New York.

January 30-31 • Relations-With Industry Division of American Society for Engineering Education, Ninth Annual College-Industry Conference, University of California, Los Angeles. Information: University of California Extension, Engineering, Los Angeles 24, Calif.

March 6-8 • Pressed Metal Institute, Annual Spring Technical Meeting, Hotel Carter, Cleveland. Institute headquarters: 3673 Lee Rd., Cleveland 20, Ohio.

March 18-19 • Steel Founders' Society of America, Annual Meeting, Drake Hotel, Chicago, Illinois. Society headquarters: 606 Terminal Tower, Cleveland 13, Ohio.

March 25-27 • American Society of Tool Engineers, Silver Anniversary Technical Meeting and Convention, Shamrock Hilton Hotel, Houston, Texas. Society headquarters: 10700 Puritan Ave., Detroit 38, Michigan.



for better
grinding...

K-7

K-7 gives superior results in grinding all steels, cast and malleable irons, titanium, carbon, rubber, ceramics and plastics (not recommended for non-ferrous metals). This all-chemical water soluble liquid concentrate is transparent and colorless in solution, is non-foaming and runs absolutely flat under all conditions. Low pH (alkalinity) makes it easy on the skin. K-7 solutions do not load work wheels, and this means fewer dressings, longer wheel life and a true ground finish. Write for further details today.



F. E. ANDERSON OIL COMPANY INC.
BOX 216, PORTLAND, CONNECTICUT

For more data circle 246 on Reader Service Card

January, 1957

modern machine shop

49

From coast to coast there's no grinding wheel service like Norton

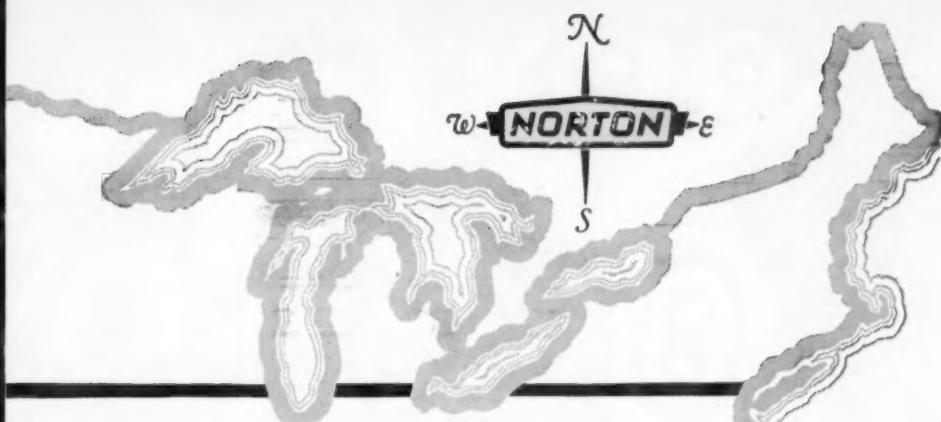
For Your General Purpose Grinding or Your High Production Jobs



Get These Facts and Prices

The new catalog *Norton Grinding Wheels*, Form 1052, brings you a lot of general purpose information and describes wheel specifications that will bring you best results. Every item in this catalog is available from stock. Included is a new supplement showing net prices. Get one from your Norton Distributor. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone directory, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. Export: Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts. For the booklets or other information write to Norton Company, Worcester 6, Mass.





Norton Nation-Wide Service Is Complete

Your Norton Distributor is one of over 315 in the United States. His men are trained to help you in grinding techniques and wheel selection. Also, he's ready to call in a Norton Abrasive Engineer for expert aid in any of your complicated grinding problems. His sizable grinding wheel stocks are fitted to the needs of his area — and they're backed by the world's largest stock, located in five Norton warehouses, as well as at Norton's Worcester headquarters. Norton manufactures grinding wheels on both coasts, at Worcester, Massachusetts and Santa Clara, California.

Norton Wheels Meet Every Possible Need

Norton makes a *really* complete line of grinding wheels to save you time and money across the widest range of grinding jobs . . . adding the same profit-boosting "Touch of Gold" to your general purpose grinding as to your production jobs. Norton wheels are made in every abrasive-and-bond combination you need, including the new, revolutionary 44 ALUNDUM® abrasive that's tops among all non-premium priced aluminum oxide abrasives.

ATLANTIC OCEAN

*Making better products...
to make your products better*

NORTON
ABRASIVES

For more data circle 248 on Reader Service Card

January, 1957

modern machine shop 51

*Trade-Mark Reg. U. S. Pat. Off.

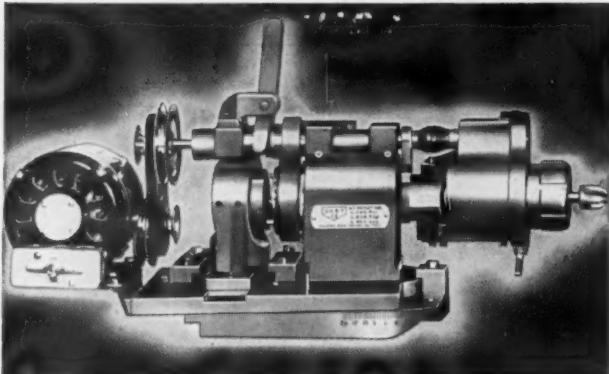
and Foreign Countries

NORTON PRODUCTS:
Abrasives • Grinding Wheels
Grinding Machines • Refractories

BEHR-MANNING PRODUCTS:
Coated Abrasives
Sharpening Stones • Behr-cat Tapes

W-1767

Precision CIRCULARITY GRINDING ATTACHMENT



Simple, speedy set-ups on this accurate attachment permit fast and easy grinding of form relief, radial relief, form and radial relief together, tapered cylindrical and straight cylindrical. Cutting tool to be produced or reworked is held in collet or between dead centers and revolves on its own axial center. Where full length of spiral cutting tools is to be ground for both form and radial relief, the Circularity Grinding Attachment travel is similar to an O.D. grinder, which insures fine finish, back taper and accurate size.

The Detroit Reamer & Tool Company Model 500 Circularity Grinding Attachment shown above is faster, easier to handle, has positive control, greater adaptability, rugged construction, and is engineered and precision built to provide the finest in precision work. Therefore, it will be of invaluable assistance to anyone whose tooling standards must meet modern production requirements.

*You Can Grind
Tools Like These
on a DETROIT REAMER
CIRCULARITY GRINDING
ATTACHMENT*

Special Cutting Tools of DEPENDABLE QUALITY



The Detroit Reamer & Tool Co. Plant is equipped with the finest in modern machinery and inspection facilities to provide you with the ultimate in precision tools. Our Engineering and production personnel with 35 years of empirical

knowledge behind them are completely qualified to expertly handle your tool needs. For dependable cutting tools—specify Detroit Reamer & Tool Co.

DETROIT REAMER & TOOL CO.

780 W. MAPLE RD. • P.O. BOX 174 • BIRMINGHAM, MICH.



For more data circle 249 on Reader Service Card

modern machine shop

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modern machine shop
431 Main St. Cincinnati 2, Ohio

January, 1957

Keep a Close Check
On Accuracy With
SUNDSTRAND Bench Centers



Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

"One-hand control" over all movable elements leaves the operator's other hand free to control rotation of the part being checked. Either headstock or tailstock can be unclamped, positioned and locked in place with a single hand operating the top lever. Investigate this bench center today.

Complete Range as Follows:

6" x 18"	12" x 48"	24" x 48"
6" x 36"	12" x 60"	24" x 60"
12" x 36"	12" x 72"	24" x 72"

FREE Additional Data

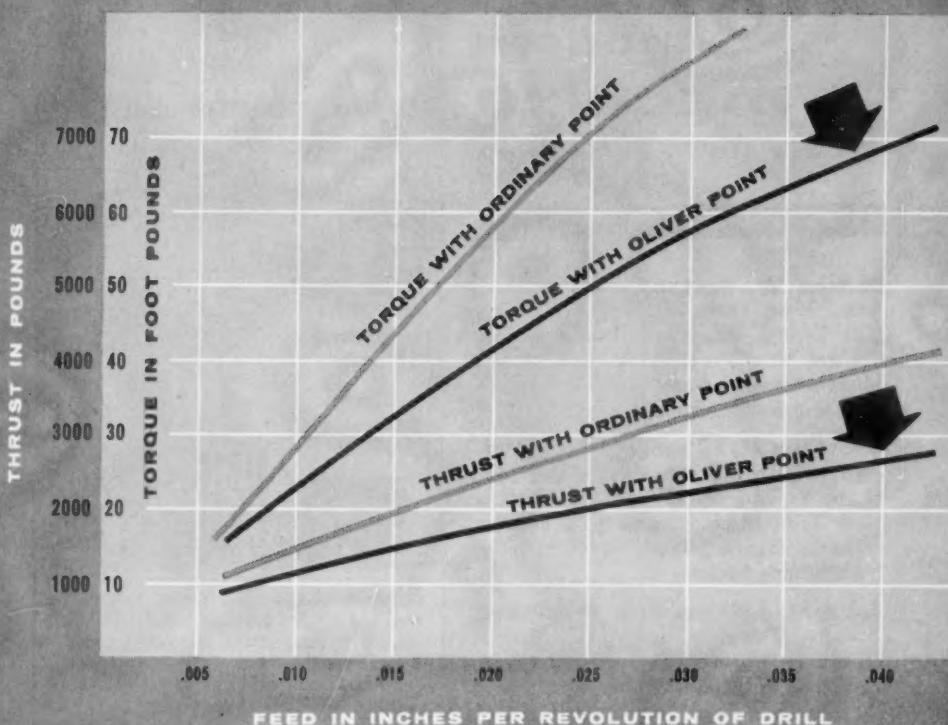
covering complete specifications and additional features is contained in this bulletin. Write for your copy. Ask for data sheet 569.



SUNDSTRAND MACHINE TOOL CO.
2539 Eleventh Street, Rockford, Ill., U.S.A.

For more data circle 250 on Reader Service Card

modern machine shop 53



CURVES SHOWING EFFECT OF VARYING FEEDS, TORQUE and THRUST—1" DRILL IN C. R. S.

OLIVER DRILL POINTER

PROOF!

OLIVER helps you get

more holes per grind!

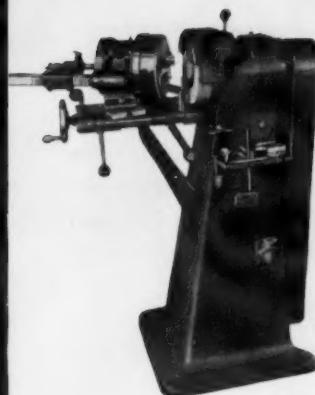


The drill point on the right is one ordinarily ground. On the left is an exaggerated view of an Oliver drill point. Note that the clearance angle on the point increases very rapidly as the drill web is approached.

Substantially less torque—much less thrust!

The above graph is the result of tests run by the research department of an eastern engineering school. It is evidence that Oliver can help you get more and better holes per grind.

Oliver's sharpening principle is to grind the drill point so that increased clearance is obtained at the center of the drill. The cut is balanced with each lip doing its equal share and the theoretically perfect point permits easier penetration. A drill sharpened this way has the stamina to deliver more holes before resharpening. Less feeding pressure means savings on drilling machine repairs, power and transmission costs and the drills themselves.

**OLIVER****510 DRILL POINTER**

Operation is semi automatic . . . covers the entire range of drill sizes from $\frac{1}{4}$ " to 3" diameters . . . grinds two-, three- and four-flute drills and all point angles from 82° to 160° included. The form of the point is controlled by a master cam which may be varied to produce the proper clearance for the material being drilled.

**OLIVER****21 DRILL POINTER**

. . . a precision machine for small drills and built to machine tool standards. Drills are located in a jig before grinding for positive set-up. A definite setting produces the desired grind each time—accurately and uniformly. The machine may be mounted on a bench or a pedestal.

**OLIVER****DRILL POINT THINNER**

. . . designed for conventional point thinning and other work such as deep hole drill thinning, notching, chip breaking, clearing out flute and many other thinning operations. The machine is completely universal, easy to set up and operate. It is a natural companion to the 510 drill pointer.

More OLIVER of ADRIAN Tool Grinding Equipment**"ACE" TOOL-CUTTER GRINDER**

Universal—grinds wide range of milling cutters and other cutting tools. Especially suited to grinding tungsten carbide.

**DIE MAKING MACHINE**

Built to produce dies, gages, cams, templates, stripper plates, etc. at greatly reduced costs. Five designs in two types.

**FACE MILL GRINDER**

The only completely automatic grinder on the market. A machine tool designed for accurate grinding.

**TEMPLATE TOOL BIT GRINDER**

Controlled form grinding for high speed, stellite and tungsten carbide single point tools.

Just check the coupon for literature on the OLIVER of ADRIAN machine you are interested in. Send it today to . . .

- | | |
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| <input type="checkbox"/> Drill Pointer | <input type="checkbox"/> Die Making Machine |
| <input type="checkbox"/> Face Mill Grinder | <input type="checkbox"/> Drill Point Thinner |
| <input type="checkbox"/> "Ace" Universal Tool and Cutter Grinder | <input type="checkbox"/> Template Tool Bit Grinder |

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COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

OLIVER of ADRIAN
OLIVER INSTRUMENT COMPANY

1430 E. Maumee St. • Adrian, Michigan

**HIGH
PRODUCTION
TO
"TENTHS"**

NICHOLS SEMI-AUTOMATIC MILLERS feature "easy to set up" air-hydraulic table cycles providing rapid approach, variable cutting feed, and rapid return. Nichols Rise and Fall Spindle head and the Cross Feed may be so equipped.

Available in two models—the 8-SA with 8½" x 30" table—14" stroke . . . the 6-SA with 6¾" x 21" table—9" stroke.



MODEL 8-SA

Manufactured by W. H. NICHOLS COMPANY

National Distributors

THE ROBERT E. MORRIS COMPANY

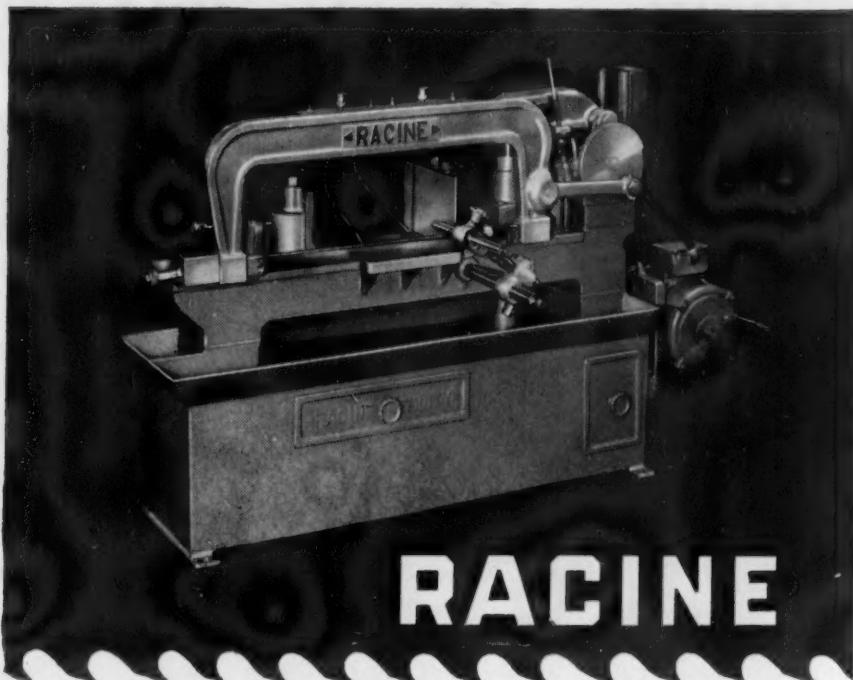
5004 FARMINGTON AVE. • WEST HARTFORD 7, CONN.

For more data circle 253 on Reader Service Card

MODELS		
	6-SA	8-SA
Table Working Surface	6¾" x 21"	8½" x 30"
Total Table Stroke	9"	14"
Total Cutting Stroke ...	5¾"	14"
Transverse Travel	7"	6"
Vertical Travel—Knee	13½"	11"
Rise and Fall of Spindle ..	4½"	4½"

Selective Speed Ranges up to 5000 R.P.M.

Write for catalog.



RACINE

LOW COST...LARGE CAPACITY

Operating Features

- 1 HYDRAULIC FEED AND CONTROL SYSTEM—Pressures are controlled by a single graduated dial. Rate of feed is controlled by a small throttling valve.
- 2 SWIVEL VISE—Quick-acting self-positioning type for cutting any angles up to 45°.
- 3 BEARINGS—Extra large bronze bushings accurately press fitted are used on all rotary shafts.
- 4 AUTOMATIC KNOCK-OUT—Saw frame automatically rises to its highest point and motor is stopped at the completion of each cut.

MODEL 816 UTILITY SAW

A fully automatic hydraulically operated all-purpose saw that will handle the full range of general cut-off work.

Any metal from tough tool steel to mild bars, tubing and structural shapes up to 8" x 16" can be cut with speed and precision.

No clutch, trains of gears, levers or ratchet devices are used. The Racine Model 816 is designed with a minimum of easily accessible precision-made working parts that assure years of dependable operation.

Write for catalog giving specifications on RACINE'S complete metal cutting saw line.



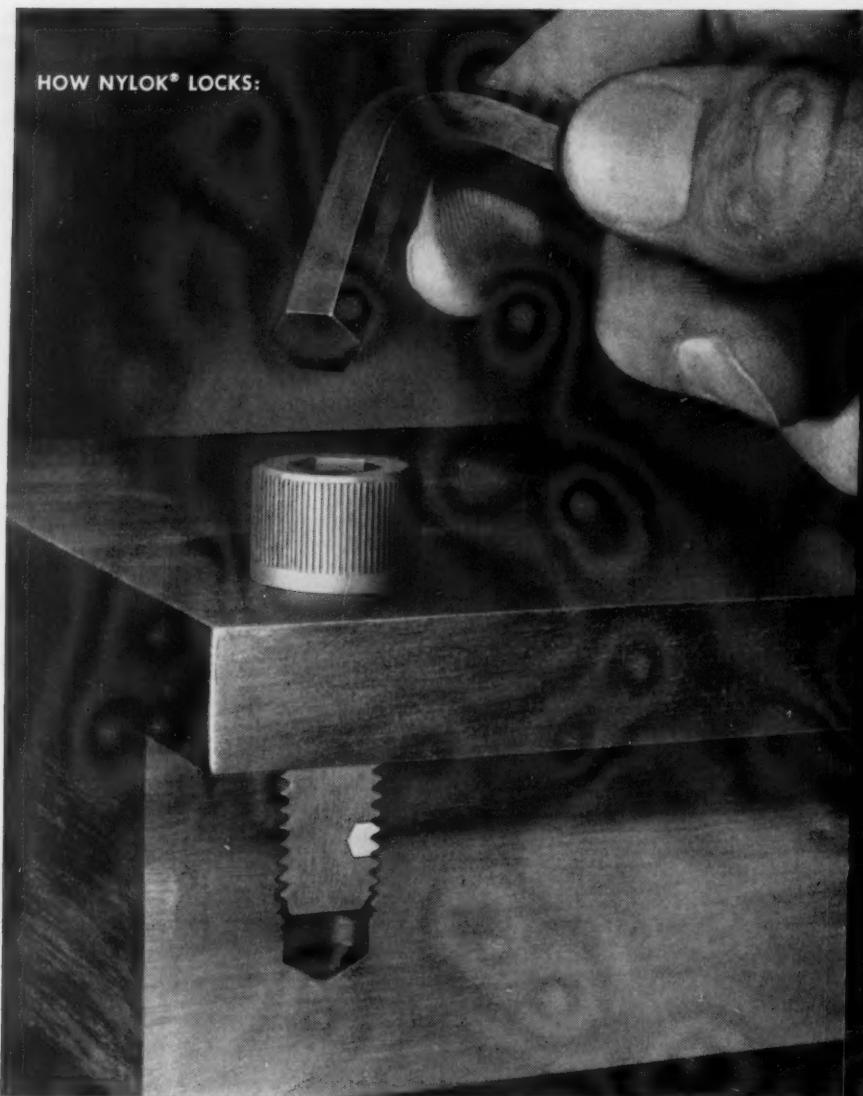
RACINE HYDRAULICS & MACHINERY, INC.

2070 Albert St., Racine, Wisconsin

For more data circle 254 on Reader Service Card

NEW—self-locking UNBRAKO

HOW NYLOK® LOCKS:



LOCKED! The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together and locks the screw securely.

socket head cap screws

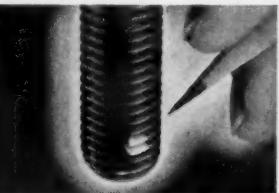
They won't work loose. And they simplify design and save production time.



Self-Locking UNBRAKO socket head cap screw.



BEFORE ASSEMBLY. The nylon pellet projects slightly. When assembled, threads will be impressed into it.



AFTER REMOVAL. "Plastic memory" of pellet has expanded impressed threads to greater diameter than screw threads. Screw can be used repeatedly. In use, "memory" keeps threads tightly locked.

UNBRAKO socket head cap screws are now available embodying the Nylok® self-locking principle. Nylok provides the first truly practical solution to the problem of making cap screws self-locking.

An UNBRAKO cap screw with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Just thread the UNBRAKO into any tapped hole. *Seated or not*, it locks positively wherever wrenching stops. The tough, resilient nylon pellet forces mating threads together and holds tight. The screw will not work loose.

You save production time when you make products with self-locking UNBRAKOS. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly wiring of cross drilled heads is eliminated. And in many cases you will save weight and mass by using shorter screws in tapped holes instead of drilling through and using nuts and lockwashers.

Self-locking UNBRAKOS are reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from -70° to 250°F. And, when screws are properly seated, the locking pellet also functions as a liquid seal.

A complete line of self-locking UNBRAKO socket screw products, in a wide range of standard sizes, materials and finishes, is available through your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

*T.M. Reg. U.S. Pat. Off. The Nylok Corporation

UNBRAKO SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.

SPS

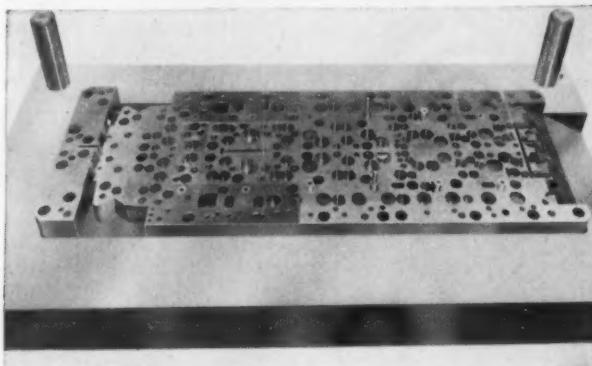
JENKINTOWN PENNSYLVANIA

For more data circle 256 on Reader Service Card

Holes JIG GROUND

with *Vulcanaire*

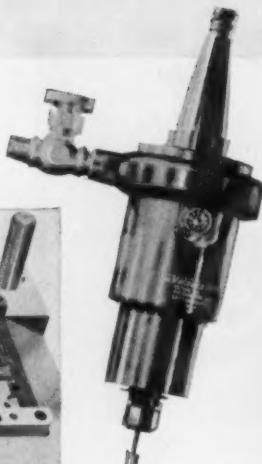
Provide yourself with this inexpensive* instrument for use on your present equipment and JIG GRIND with a guarantee.



A seven station die from Vulcan's contract Tool Room
(Your Tool Room in Dayton).

Standard sized punches and buttons were used. But since forming and piercing operations were involved, hardening of the sections was necessary followed by JIG GRINDING. Result: Close tolerances held easily and perfect progression throughout — another satisfied customer.

*Vulcanaire equipment pays for itself on the first job.



Vulcan's
45th year.

Borrow
Vulcan's
instructive
movie on
jig grinding.

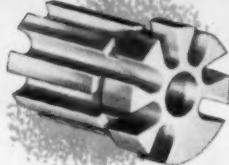
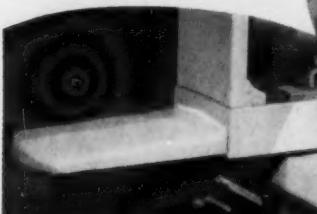
Services of YOUR TOOL ROOM in Dayton

Engineering, Processing, Designing . . . Special Tools . . . Dies . . .
Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce,
Assemble and Size . . . Vulcanaire Grinding Heads . . . Motorized
Rotary Tables . . . Plastic Tooling . . . Vulcanaire Jig Grinders.

VULCAN TOOL CO. • 710 LORAIN AVE. • DAYTON 10, OHIO



"Cool-Grinding"
ends need for
costly Dry Grinding
on any job...



THE JOB NOBODY WANTED — grinding slots in this cavity die insert used for plastic TV tube sockets. 5/8 of weight of piece removed by grinding. "Cool-Grinding" made it routine.

FREE CATALOG

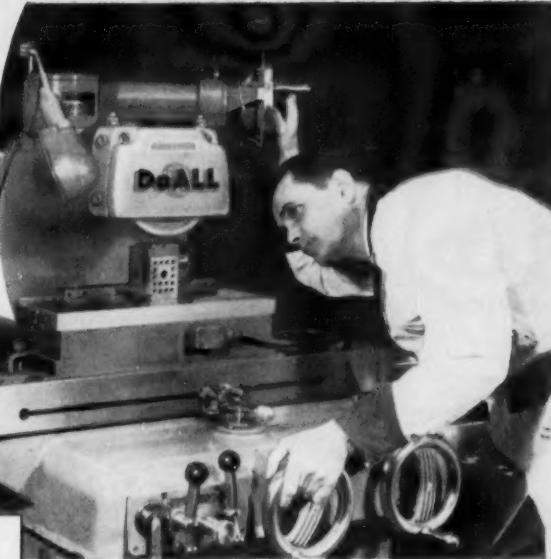
describes combination flood and "Cool-Grinding" attachment for all DoALL Surface Grinders.



FREE DEMONSTRATION

Write for details on a DoALL Mobile Demonstration of precision grinding and "Cool-Grinding" attachment.

*Cool Grinding U.S. Pat. No. 2470350



Coolant Does Not Obstruct Operator's View . . .

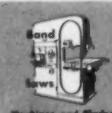
User Ups Production 250%, Wheel Life 350%

Do you have toolroom or production line jobs you are grinding "dry" because the operators have to see the work? With DoALL "Cool-Grinding"*, coolant is introduced into the sides of the wheel to emerge as a cooling mist at the point of greatest heat generation. Heat is effectively dissipated. No coolant nozzle or heavy coolant stream obstructs operator's view and the only reason for ever employing costly "dry" grinding is eliminated.

Here's what "Cool-Grinding" did for Milwaukee Precision Grinding Corp., Milwaukee, Wisc. on the intricate job pictured:

Work loss due to burning and warpage from "dry" grinding was eliminated • Finish was improved • Harder, finer wheel can be used • Production increased 250% • Former week's work now done in two days • Wheel life increased 350% • Wheel dressing time slashed.

The job "nobody wanted" Milwaukee Precision Grinding took as a challenge . . . and found the answer—thanks to DoALL "Cool-Grinding". Call your local DoALL store or write for details. The DoALL Company, Des Plaines, Illinois



Machines and Blades



Surface Grinders



Power Saws

MACHINE TOOLS

Call Your DoALL Service-Store



DoALL
SAW BANDS



Drill Bits



MEASURING
INSTRUMENTS



DoALL
GRANITE
PLATES



DoALL
STEEL
BARS

SHOP SUPPLIES

IN STOCK

For more data circle 258 on Reader Service Card

MODEL TR-I
NAMCO ROLL-O-MATIC
rolling $\frac{1}{16}$ " pitch
single lead screw
on $4\frac{1}{8}$ " long
8620 steel

Namco ROLL-O-MATIC

**assures precision thread rolling...
automatically or manually...on
limited-length or feed-through jobs**



Write today for your copy of 12-page illustrated Bulletin No. TR-49A or ask our representative to call.

STRAIGHT LINE ROLL SUPPORT provides positive powerful action

FOUR INTERCHANGEABLE HEADS cover work range $\frac{1}{8}$ to $1\frac{1}{2}$ " diameters

FULL HYDRAULIC DRIVE of roll spindles and cam ring insures exact thread form

SELECTIVE SPINDLE SPEEDS from 75 to 600 RPM

SIMPLE, SAFE AND EASY for the operator

National Acme

THE NATIONAL ACME COMPANY, 183 EAST 131ST STREET, CLEVELAND 8, OHIO

SALES OFFICES: • Newark 2, N. J. • Chicago 6, Ill. • Detroit 27, Mich.

For more data circle 260 on Reader Service Card

NOW!

EMPIRE'S LUERS CUT-OFF BLADES...

Precision Ground on All Surfaces

These new Luers blades are held to precision tolerances on centrality and parallelism. Close tolerance grinding of all blade surfaces assures:

1. Accuracy of blade size and complete blade interchangeability.
2. Centrality of head to shank held to close tolerance.
3. Better blade cutting edges, longer blade-life, smoother cut-off surfaces



In addition you get all the established features of the Luers design, such as: hollow ground top which results in free chip action and cooler operation; constant side and angular clearances; resharpening on front face only.

Standard Luers blades are available from stock in 4 grades of high speed steel and in 4 grades of carbide tips. Solid cast alloy blades are also available on customer order.

Made under license issued by John Milton Luers

8776 GRINNELL AVE.

EMPIRE
TOOL COMPANY

DETROIT 13, MICHIGAN

For more data circle 261 on Reader Service Card



HIGH SPEED PRECISION BENDING

New Holland Machine Co. forms variety of components in 16 hrs. a day production.

DI-ACRO HYDRA POWER BENDER

Simple and complex bends are being formed at low cost in daily production across the nation with hydraulically operated Di-Acro Benders. The Bender can be delivered completely tooled by the factory for bending tubing, moulding, extrusions and special materials. For a free production estimate, send a dimensional sketch and sample material for your component.



SEND FOR "IT'S EASY TO BEND"

Thirty-six pages of valuable metal working information for anyone with bending problems. It's a "how to" book covering many materials and shapes. No charge—write today.

pronounced die-ack-ro

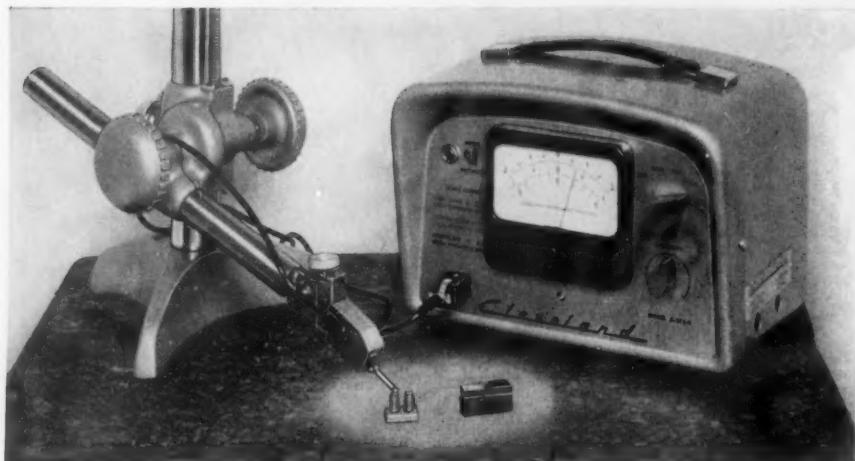


O'NEIL-IRWIN MFG. CO., 306 8th Ave., Lake City, Minn.

For more data circle 262 on Reader Service Card

January, 1957

modern machine shop 65



WHY... Should You Measure To MILLIONTHS OF AN INCH?

All gaging authorities agree that it is necessary to gage to an accuracy 10 TIMES GREATER than the desired working tolerance. Therefore, if your tolerances are .0005" or less, you should use a gage accurate to 50 millionths of an inch to assure proper dimensional control. Conventional mechanical indicators cannot maintain, or repeat this degree of accuracy.

Industry is finding the electronic indicator not only more accurate and repeatable, but also less subject to damage than conventional mechanical indicators. In addition, its simplicity of operation enables any operator, who can use a dial indicator or micrometer properly, to measure accurately to millionths of an inch.

Simple And Easy To Read To MILLIONTHS OF AN INCH . . .

The INDI-AC ELECTRONIC INDICATOR is merely set to the required dimension with standard gage blocks. The parts to be gaged are then placed under the gage tip and the meter indicates the variations from the desired dimension MAGNIFIED UP TO 10,000 TIMES! Thus it is far simpler and easier to read than a dial indicator or micrometer.

This versatile instrument is used for all gaging purposes such as surface plate or height gage work, checking setups, runout or alignment of parts or machines.

Using the INDI-AC, tolerances which you now estimate will be easy to work to and measure.

**WRITE for further details on the new INDI-AC and
other Electronic Production Gages, TODAY!**

Cleveland INSTRUMENT COMPANY, INC.
739 Carnegie Avenue • Cleveland 15, Ohio

For more data circle 263 on Reader Service Card



"Doc! It's like fighting DERMATITIS with an armored glove."

Except WEST protective gloves are invisible:

- quickly applied
- comfortable to wear
- easily washed away.

For skin exposed to oils, dust, grease and grime:

- use PROTECTIVE CREAM #211.

For skin exposed to acids, alkalies and inorganic chemicals:

- use PROTECTIVE CREAM #311.

For skin exposed to organic solvents, acetates and cutting oils:

- use PROTECTIVE CREAM #411.

WEST PROTECTIVE CREAMS protect against hundreds of troublesome industrial irritants. They're antiseptic. Inhibit harmful bacteria with Hexachlorophene. And they protect for extended periods of time.

How Convair stops Dermatitis before it starts

A simple safety precaution is preventing dermatitis at the huge \$71,000,000 aircraft plant of Convair at Fort Worth, Texas. SAFETY ENGINEER S. A. GROSS (above) tells employees how to protect their hands against outbreaks of dermatitis with West Protective Cream #311. They cooperate — with their own well-being in mind. The result has been a reduction in the incidence of dermatitis to almost nil.

Would similar results interest you? Send the coupon.

LARGEST COMPANY OF ITS KIND IN THE WORLD



WEST DISINFECTION COMPANY, 42-16 West Street, Long Island City 1, N. Y.
Branches in principal cities • In Canada: 5621-23 Côtegrain Ave., Montreal

- Please send your 24 page booklet "The Control of Dermatitis in Industry."

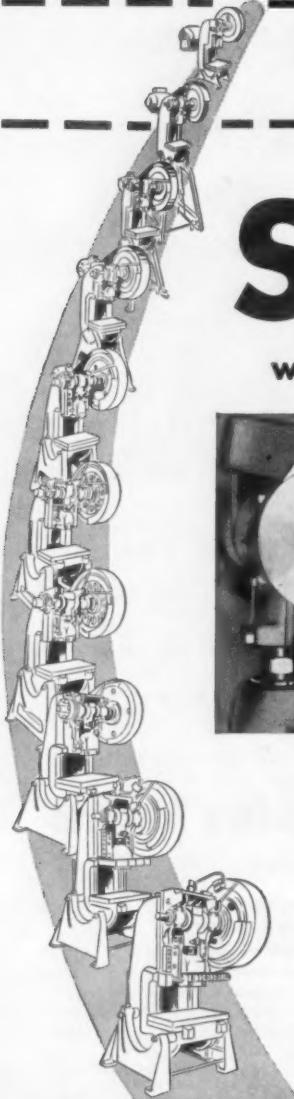
- Please have a West representative telephone for an appointment.

Name _____

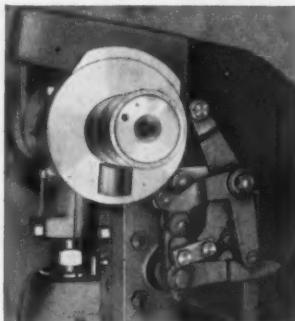
Position _____

Mail this coupon with your letterhead to Dept. 20

For more data circle 264 on Reader Service Card



DISCOVER THE "difference"
in
SAFETY
with PRESS-RITE POWER PRESSES



PRESS-RITE

Single Stroke Non - Repeat Mechanism is operated mechanically with two positive cams . . . a superior design found only on PRESS - RITE PRESSES!

10 CAPACITIES
2 to 85 TON

More and more press users are standardizing with PRESS-RITE'S because of SAFETY. The PRESS-RITE Single Stroke Non-Repeat Mechanism is the safest on presses today. Operators have confidence in PRESS-RITE PRESSES. This keeps efficiency and production high . . . and insurance rates low! Make your next press . . . PRESS-RITE . . . and be safe! Air operated clutch and brake also available, optional.

Write for Press-Rite catalog No. 855 with illustrations and specifications of all models, 2 to 85 tons capacity.

PRESS-RITE DIVISION of

SALES SERVICE MACHINE TOOL COMPANY
2347 University Avenue • St. Paul, Minnesota

Used by more . . . for more production

PRESS-RITE

OPEN BACK • INCLINABLE Power Presses

For more data circle 265 on Reader Service Card

JOHANSSON GAGING EQUIPMENT

Assures You
Precision to the
Finest Degree
to Meet Your
Requirements
—Backed by the
Name Supreme
in the World of
Measurement

GAGE BLOCKS

(JOHANSSON) and accessories. Short deliveries. Inspection and reconditioning service available at our plant.

INTERNAL INDICATORS

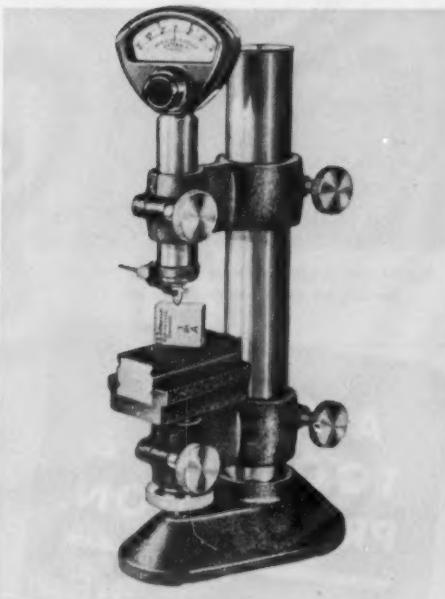
(for inside measurements .155 to 24 inches). Scale range plus or minus .001 graduated to .0001 and minus .020 graduated to .0001.

MIKROKATOR

(Amplifier—for outside measurements)
Graduations .0001 to .000001 or .01M to .0002M.

OTHER JOHANSSON PRODUCTS

Micrometers, Snap Gages, Extensometers, Dynamometers, Hardness Testers, Surface Finish Indicators, Interferometers, Plugs, Rings and Special Gages.



MIKROKATORS

(AMPLIFIERS)

FOR MEASUREMENT IN INCHES

Catalog Number	Scale Range Inches	Graduations Inches
510-E2	0".006	0".0001
510-E4	0".0024	0".00005
510-E5	0".0014	0".00002
510-E6	0".0008	0".00001
510-E7	0".0004	0".000005
510-E8	0".0002	0".000002
510-E9	0".00004	0".000001

Write for Literature

C. E. JOHANSSON GAGE CO.

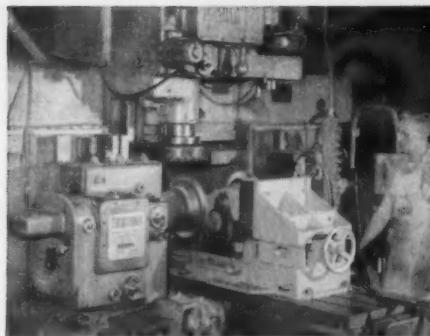
A DIVISION OF SWEDISH GAGE CO.

10641 HAGGERTY AVE. • BOX 4086 NORTHEASTERN STATION • DEARBORN 1, MICH.

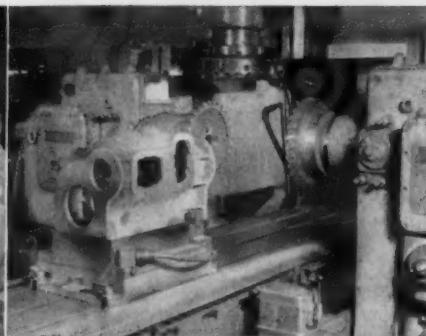
For more data circle 266 on Reader Service Card

January, 1957

modern machine shop 69



Sundstrand magnetic fixture provides two-way holding for duplex milling ends of case.



Base unit only, used when milling pads on side of case.

**ACCURACY,
TOOL LIFE &
PRODUCTION**
improved with
SUNDSTRAND
Magnetic Fixtures

Additional Data



.....
...is available on many interesting and profitable Sundstrand magnetic clamping fixture applications. Write for your copy today. Ask for Bulletin 567-M.



SUNDSTRAND
Magnetic Products Co.

Division of Sundstrand Machine Tool Co.
1020-9th ST. • ROCKFORD, ILLINOIS

For more data circle 267 on Reader Service Card

SOSSNER

"the mark of quality since 1910"

ANNOUNCES
SOME NEW TAPS

WE ARE PROUD TO PRESENT THE LATEST ADDITIONS TO OUR COMPLETE LINE OF GROUND THREAD TAPS...

Spiral Taps

THE MOST COMPLETE LINE.



REGULAR STYLE—#4 thru 5/16". This is the general purpose spiral fluted tap, primarily for use in blind holes in non-ferrous materials. It cuts reliably close to size.



HOOK STYLE—#4 thru 5/16". The increased hook at the cutting face and a narrower land make this style more free cutting. Desirable for bar-stock aluminum and diecast alloys.



THREE FLUTE STYLE—1/4" and 5/16". This is a stronger construction than the two flute style and is recommended primarily for steel.



DOUBLE SCOOP STYLE—1/4" and 5/16". This unique construction combines a narrow lead, hooked cutting face, maximum flute area and chip-breaker effect. Specially developed for deep blind holes.



SOSSNER



elektra LUBETM A PERMANENT SUPER-LUBRICANT

The elektra LUBE process imparts a thin durable deposit which acts as a permanent super-lubricant which imbeds itself into the microscopic pores of the ground tap, resulting in a smooth burnished surface which becomes an integral part of the tap.

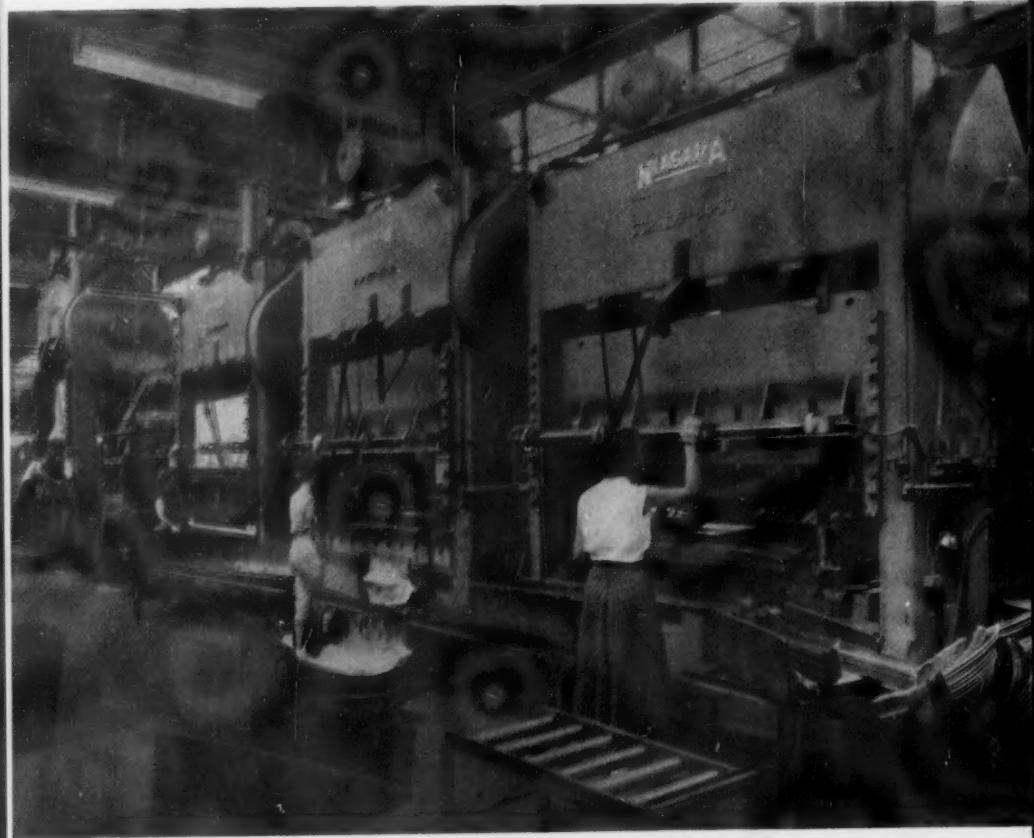
High pressures at A and B force out conventional lubricant, elektra LUBE takes over at these critical points and provides permanent super-lubrication.



SOSSNER TAP & TOOL CORPORATION
29 BROADWAY, LYNBROOK, L.I., N.Y.

Inquiries from representatives and distributors are invited.
For more data circle 268 on Reader Service Card

"we concentrate on Niagara



NIAGARA

DOUBLE CRANK STRAIGHT

America's most complete line of presses, press brakes, shears, other machinery and tools for plate and sheet metal work



presses...

In-line operation of four Niagara Series SC-2 Presses, engaged in progressive production of automotive side moldings from .025" #430 stainless steel.

Press operator shows a blank and formed molding which will grace one of the "Big Three" cars.



SIDE PRESSES

...they require a minimum of maintenance"

Producing up to 1,750,000 automotive moldings per month, these four Niagara Double Crank Straight Side Presses do the work of eight for a large Midwestern metal stamping firm. Their long beds enable the outfitting of each press with two sets of dies for two separate operations.

"We believe in standardizing. That is why we concentrate on Niagara Presses. They require a minimum of maintenance. When jobs come in, we are sure we can get them out. They are a volume machine," says the vice president and plant superintendent.

... and with good reasons, this famed line of Niagara presses requires a minimum of maintenance:

- *Rugged, integral, all-welded steel frames of exclusive triple box section design properly resist deflection to assure greater accuracy and longer die life.*
- *Laminated non-metallic ways of box type welded steel slides are a positive safeguard against scoring and assure trouble-free service.*
- *Low inertia pneumatic friction clutch reduces beat and wear. Only the shaft and driving plate are started and stopped at each cycle. Most of the clutch weight continues to rotate with the flywheel.*
- *Outboard mounting of clutch makes it accessible for easy maintenance... without disturbing any drive or crown parts.*
- *No adjustment for wear of clutch plate is necessary. It is self-compensating.*
- *Clutch linings are cycle-welded to plate, without rivets, increasing effective life.*
- *Brake shoes are full floating and self-aligning... cannot cock, bind or wear unevenly.*
- *Steel gears run in totally enclosed oil baths. Centralized pressure lubrication sends vital oil to journals, ways and wherever necessary for long efficient, service life.*

Like this well known metal fabricator, it will be profitable for you, also, to consider standardizing on Niagara presses. First of all, Niagara has the most to offer... straight side double crank, single crank and eccentric geared, open back inclinables and dozens of others. Secondly, in the words of the same company's purchasing agent: "The prices on Niagara Presses are right... and they do the job."

Built in 50 through 400-ton capacities, Niagara Double Crank Straight Side Presses are readily equipped with automatic feeds, variable speed drives, iron hands and other automatic materials handling devices so popular with the automotive and appliance industries. Post yourself on this important line by requesting Bulletin 64.



NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N.Y.

DISTRICT OFFICES:

Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia

Distributors in principal U.S. cities and major foreign countries

New CENTERLESS LAPPER

by SIZE CONTROL



THE NAMES SPOTLIGHTING THIS
MACHINE DEMAND THE ULTIMATE
IN PRECISION AND QUALITY IN
THEIR OWN PRODUCTS.



Write or phone today for literature
describing what this machine will do
for your cylindrically lapped parts.

SIZE CONTROL COMPANY

2500 WEST WASHINGTON BOULEVARD
CHICAGO 12, ILLINOIS

MONree 6-6710

WALSH PRESS & DIE COMPANY
4709 West Kinzie Street
Chicago 44, Illinois
Estebrook 8-6700

Punch Presses
Since 1907

MIDWEST GAGE LABORATORY
2500 West Washington Boulevard
Chicago 12, Illinois
MONree 6-6710

Inspection Service
for Industry

Divisions of American
Gage and Machine
Company

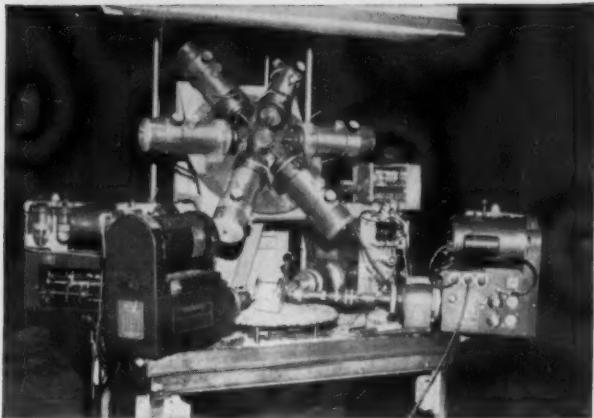


**Standard
DUMORE
Components
make special
production
machines . . .**

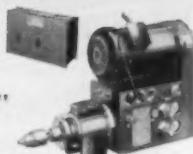
**for Quick, Low-Cost
AUTOMATION**

To get quick, precision automation at low initial machine cost, Presto Line Corp., Los Angeles, uses three types of standard Dumore components. These low-cost Dumore Units, set up as shown, recess, tap and drill zinc die castings in one continuous operation handled by one man. From 260 to 300 pieces per hour flow through this special production machine with *no scrap losses!*

Get the facts, now, on how Dumore automatic standard components can give you low cost, precision automation for your work!



**NEW
Series 28
Automatic
"DRILL-N-TAP"
UNIT**



Two tools in one. Drills or taps at the flip of a switch.

**Series 24
Automatic
DRILL UNIT**



Built-in controls. For single or multiple-unit operations, frequent change-overs.

**Series 20
Automatic
DRILL HEAD**



Built-in controls. For small parts drilling. No. 80 to 5/32" drill capacity.

ASK YOUR DISTRIBUTOR FOR DETAILS . . . OR WRITE

YOU CAN DO MORE WITH DUMORE DRILL UNITS



DUMORE
PRECISION TOOLS®

AUTOMATIC
DRILL UNITS
TOOL POST AND
HAND GRINDERS

1302 Seventeenth Street, Racine, Wisconsin

For more data circle 271 on Reader Service Card

NOW

Flame hardened bed ways
... STANDARD EQUIPMENT
at NO EXTRA COST!



6319 ILLUSTRATED,
1" COLLET CAPACITY.
AVAILABLE WITH VARI-
ABLE SPEED DRIVE.

ON ALL MODELS OF

CLAUSING 12" LATHES

With the introduction of flame hardened bed ways as standard equipment at *no extra cost*, another important exclusive feature has been added to the long list of *Plus Values* that make the Clausing 12" Lathes outstanding in their price field. Write for illustrated literature, and also literature on the new variable speed drive and 12" Hydraulic Tracer Lathe.



CLAUSING DIVISION ATLAS PRESS COMPANY

1-110 N. PITCHER ST., KALAMAZOO, MICHIGAN
For more data circle 272 on Reader Service Card

BRASS

keeps sales up...

manufacturing costs down

**TURNER IS A LONG-TIME USER OF
ANACONDA BRASS ROD AND TUBE—
GIVES 10 REASONS WHY—**

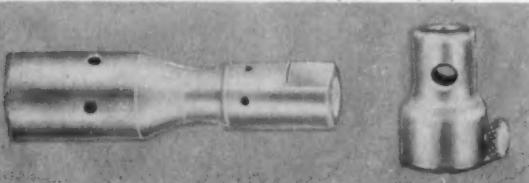
Blow torches built by The Turner Brass Works, Sycamore, Ill., have a reputation for dependable operation and long life. Since 1871, brass has been used consistently in their construction and has built a quality reputation for Turner. Turner prefers Anaconda Brass as a quality metal and looks to The American Brass Company as a quality source of supply.

SEE

These are the reasons given:

- ① Brass is the quality material needed for the service.
- ② Brass is easily machined at high speed, with less tool breakage—manufacturing costs are 15% lower than with other metals.
- ③ Close tolerances are easily held with brass.
- ④ Threading holds well—yet accessories are easily screwed on and off.
- ⑤ Brass takes a good finish—polishing is easy and economical.
- ⑥ Clean, polished brass products have proven high sales appeal.
- ⑦ Brass stands up under alternate heating and cooling.
- ⑧ Brass resists corrosion—the torches are used on land and sea, throughout the world.
- ⑨ Brass gives superior wear on valve seats.
- ⑩ Brass has high public acceptance as a quality material.

Turner liquefied petroleum torch No. LP-555, with disposable fuel tank. Below are accessories of brass—holder for soldering tip and a heavy-duty burner.



*The American Brass Company, Waterbury 20, Conn.
In Canada: Anaconda American Brass Ltd., New Toronto, Ont.*

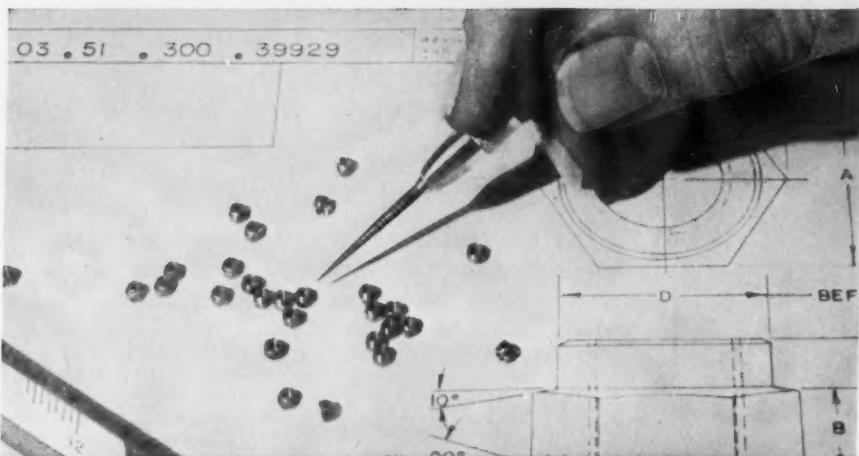
ANACONDA®
COPPER • BRASS • BRONZE

For more data circle 273 on Reader Service Card

January, 1957

modern machine shop

77



FLEXLOC MICROSIZE locknuts meet designers' needs for tiny precision nuts that retain strength and holding power in the smallest assemblies—servomechanisms, electronic and electrical equipment, all miniature devices.

New FLEXLOC Microsize Locknuts

Now available in Alloy Steel, Stainless Steel, Brass and Aluminum for lighter, more compact designs



New FLEXLOC Microsize locknuts are smaller and lighter than regular FLEXLOCS of the same nominal diameter. Wrenches of smaller size are used to install them. Mating joints or flanges can be designed smaller—with no loss in strength or convenience of assembly.

Microsize FLEXLOCS have all the advantages of larger FLEXLOCS. One-piece, all-metal construction—nothing to put together, come apart, lose or forget. Use them as lock or stop nuts—they stay put anywhere on a threaded member as soon as the locking threads are fully engaged. Uniform locking torques insure accurate preloading. There are no non-metallic inserts to pop out or deteriorate. Moisture, dryness, oil won't affect these Microsize FLEXLOCS. Just screw them on. They lock and stay locked. Vibration won't shake them loose.

For complete information on Microsize FLEXLOCS, consult your authorized SPS distributor. Or write STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

For more data circle 274 on Reader Service Card

SIZE	Across Flats		Shoulder Height		Across Corners MIN.	Height +.000 -.003
	MAX.	MIN.	MAX.	MIN.		
0-80 NF-3B	.111	.107	.047	.042	.123	.075
1-64 NC-3B	.127	.123	.0635	.0585	.141	.090
1-72 NF-3B	.127	.123	.0635	.0585	.141	.090
2-56 NC-3B	.158	.153	.068	.063	.176	.105
2-64 NF-3B	.158	.153	.068	.063	.176	.105
3-48 NC-3B	.190	.183	.071	.066	.210	.120
3-56 NF-3B	.190	.183	.071	.066	.210	.120
4-40 NC-3B	.190	.183	.072	.067	.210	.120
4-48 NF-3B	.190	.183	.072	.067	.210	.120

SPECIFICATIONS: Available in brass (plain or cadmium plated) and aluminum (plain or chemically treated), for temperatures to 250°F; alloy steel, 18-8 stainless, for temperatures to 550°F.

FLEXLOC® LOCKNUT DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

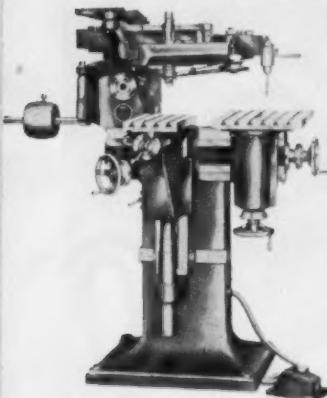
OUTSTANDING NEW MACHINERY AT LOWER COST!

\$1. BUYS ANY MACHINE

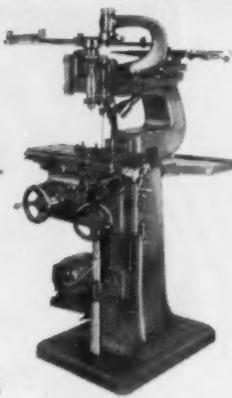
upon termination of 3 year Rental Plan.

UNUSUAL HIGH PRECISION

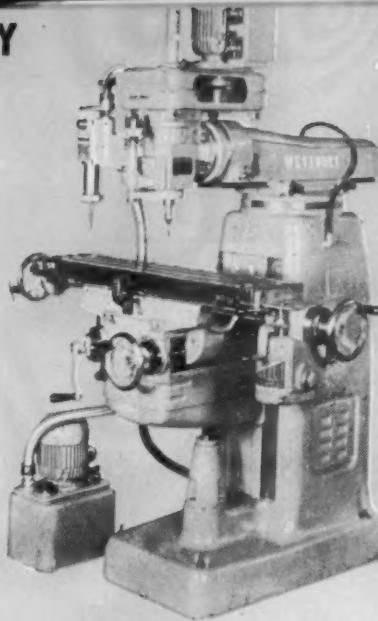
PEAR 3 and 2 dimensional pantograph engravers



3 dimensional PF/2
\$2,695.00

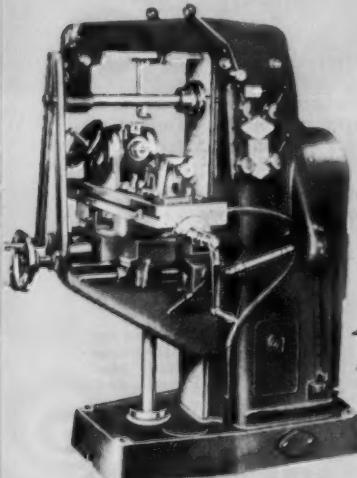


2 dimensional CG/3
\$1,495.00

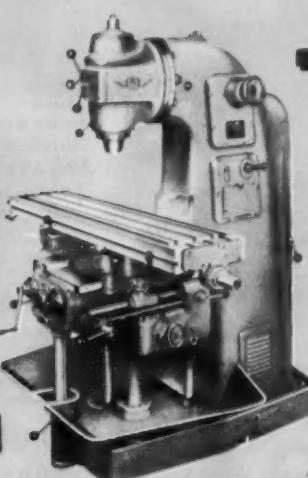


CONTOUR MILLER
with hydraulic high speed vertical
duplicating head.
\$3,190.

PEDERSEN MILLING MACHINES



VPU-O \$2,595.



VPV-2 \$6,590.



**PEDERSEN UNIVERSAL TOOL &
CUTTER GRINDER, MODEL U.S.L.**
Main spindle rated at 3,800 to 5,750 RPM.
36½" x 5½" table working surface.
\$2,595

AARON MACHINERY CO., INC.

Dept. M • 45 CROSBY ST., NEW YORK 12 • WA 5-8300
SEE PAGE 82

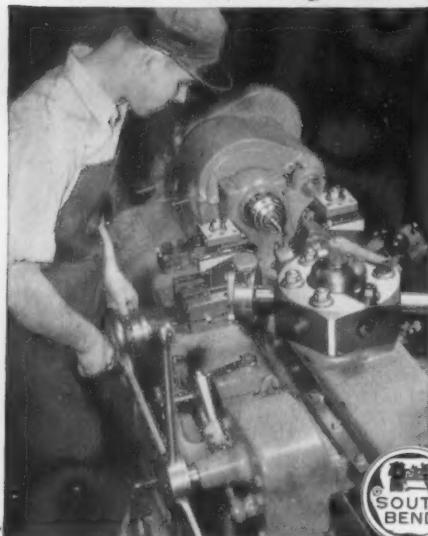
Branches: Buffalo, N. Y.; Mineola, N. Y.; Los Angeles, Calif.

LIBERAL
TERMS

SOUTH BEND TURRET LATHES



Above—13" Turret Lathe, 13" swing, 1" collet
Below—2-H Turret Lathe, 16" swing, 1" collet



**Put Precision
Into Production**



10" Turret Lathe, 10" swing, 1" collet

Precision built for precision work, South Bend Turret Lathes give dependable performance on exacting, close-tolerance operations. They have ample power for efficient production and the rigidity for producing a fine finish.

Made in three sizes: 13" and 16" swing with power feed bed turrets and 10" swing with handlever bed turret. All take $1\frac{1}{8}$ " through spindle, 1" through collet and have power feed universal carriage.

Write for complete information on South Bend Turret Lathes, Toolroom Lathes, Engine Lathes, Milling Machines, Shapers, Drill Presses and Pedestal Grinders.



SOUTH BEND LATHE
SOUTH BEND 22, INDIANA
BUILDING BETTER TOOLS SINCE 1906

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If you use twist drills as fast
as some folks chain smoke...



This brand cuts down your drill
usage, product time and costs!

*The more twist drills you use,
the more you need Union*

Union also manufactures milling cutters, gear cutters, hobs, reamers and carbide tools. Available nationally through Union warehouses in Atlanta, Chicago, Detroit, Fort Worth, Los Angeles, New York City, and San Francisco. S. W. CARD DIVISION, Mansfield, Mass.; BUTTERFIELD DIVISION, Derby Line, Vt.

UNION

TWIST DRILL COMPANY, Athol, Massachusetts

See Your UNION DISTRIBUTOR for cutting tools that will save you time and money

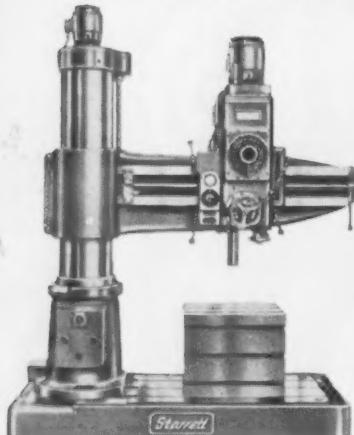
For more data circle 277 on Reader Service Card

Best Values in U.S.A.

New Features — High Quality . . .

STARRETT

RADIAL DRILLS

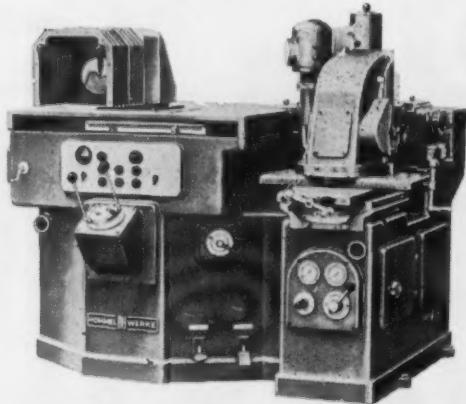


Sizes 2 1/2' to 6'
from \$1785. to \$6985.

OUTSTANDING NEW MACHINERY

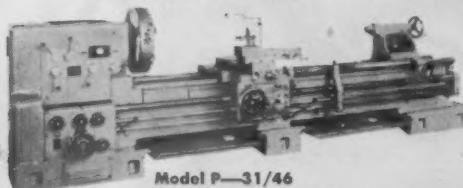
at Lower Cost!

\$1. BUYS ANY MACHINE upon termination of 3 year rental plan
HOMMEL model OPSM



OPTICAL PROFILE GRINDER

IMPERIAL LATHES—Flame Hardened and Ground Bed Ways



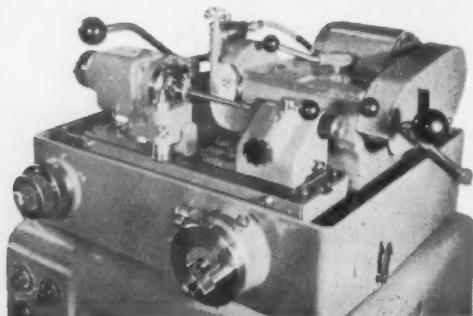
Model P—31/46
Swing over ways 31"
Swing in gap 46" \$9790.



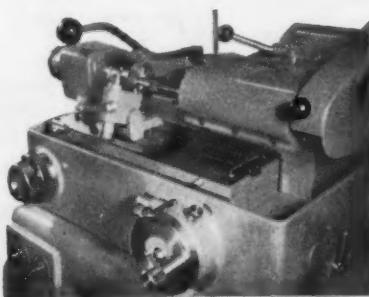
Model PS 34/1
Swing over ways 34"
Swing in gap 61" \$12,990.

All SIZES available
12"-67" swing

OVERBECK external and internal — precision GRINDERS



Cap. 1-9/16" O.D. x 4 3/4" \$2,995.



Cap. 2 3/8" x 4 3/4" \$3,195.

AARON MACHINERY CO., INC.

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Branches: Buffalo, N. Y.; Mineola, N. Y.; Los Angeles, Calif.

LIBERAL
TERMS

**WHAT...
NO UNIVERSAL
DRILL
BUSHINGS?**



Wherever there are holes
to drill using jigs or fixtures,
it pays to specify Universal drill
bushings. Machined from finest quality

steel, Universal bushings have super-finished bores which lengthen tool life and reduce bushing wear over long production runs.

Knurled heads provide quick, sure grip. Blended radii on top-inside diameters help prevent tool hang-up and breakage. Standard sizes and lengths in stock for immediate delivery.



FREE UNIVERSAL SELECTOR. Gives all engineering data for selection of all types and sizes of drill bushings up to 1 1/4" drill size. Send request on your company letterhead.



UNIVERSAL ENGINEERING CO. FRANKENMUTH 9, MICHIGAN

198

For more data circle 279 on Reader Service Card

January, 1957

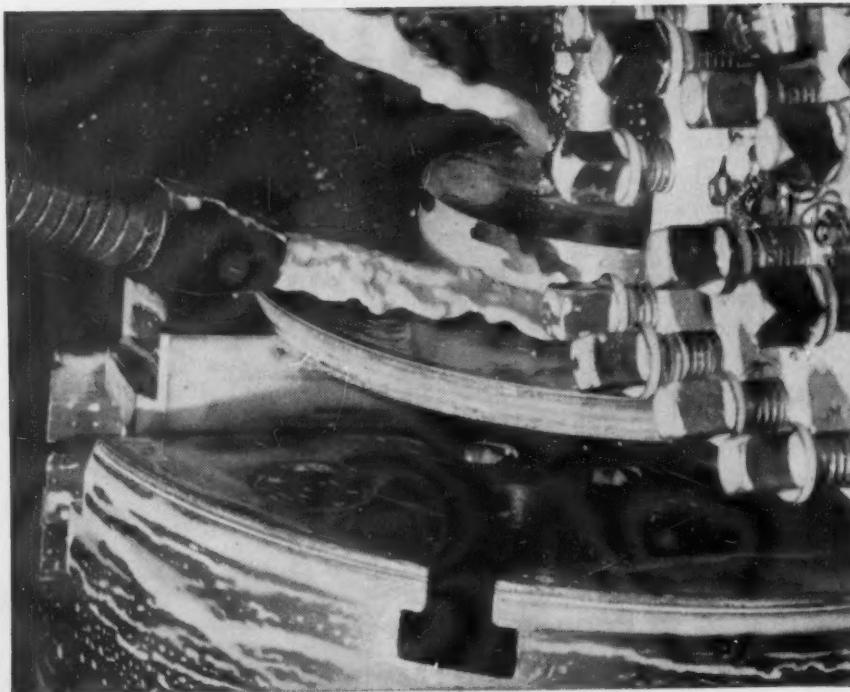
modern machine shop 83



HOBBLING. Flooding the cutting edges of a high-speed-steel hob working 1117 steel, S.E.C.O. provides lubricity and cooling power needed for long tool life.



CENTERLESS GRINDING. In grinding 4320 H steel pins, S.E.C.O. keeps wheels clean. Grinding dirt drops out quickly, is not recirculated. Parts are rust-protected.



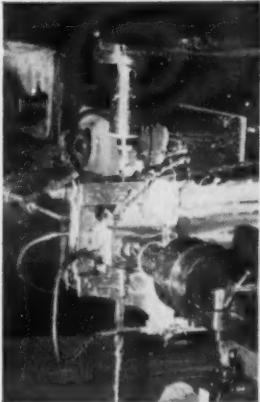
TURNING AND DRILLING. During the machining of a 9-in. piece using carbide-tipped tools, S.E.C.O. removes heat fast ...assures long runs, top speeds.

SUNOCO EMULSIFYING CUTTING OIL HANDLES 4 TOUGH JOBS . . . EASILY

Whether you are shaping, hobbing, grinding, reaming, boring or milling, it will pay you to look into the advantages of SUNOCO EMULSIFYING CUTTING OIL.

Moderately priced, S.E.C.O. has been industry's most widely used soluble cutting oil for years. Higher-than-ever machining efficiency, increased dewatering, easier mixing, and other added advantages are helping keep S.E.C.O. the leading emulsifying cutting oil in the country today.

For complete information about S.E.C.O. see your Sun representative. Address SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MM-1.

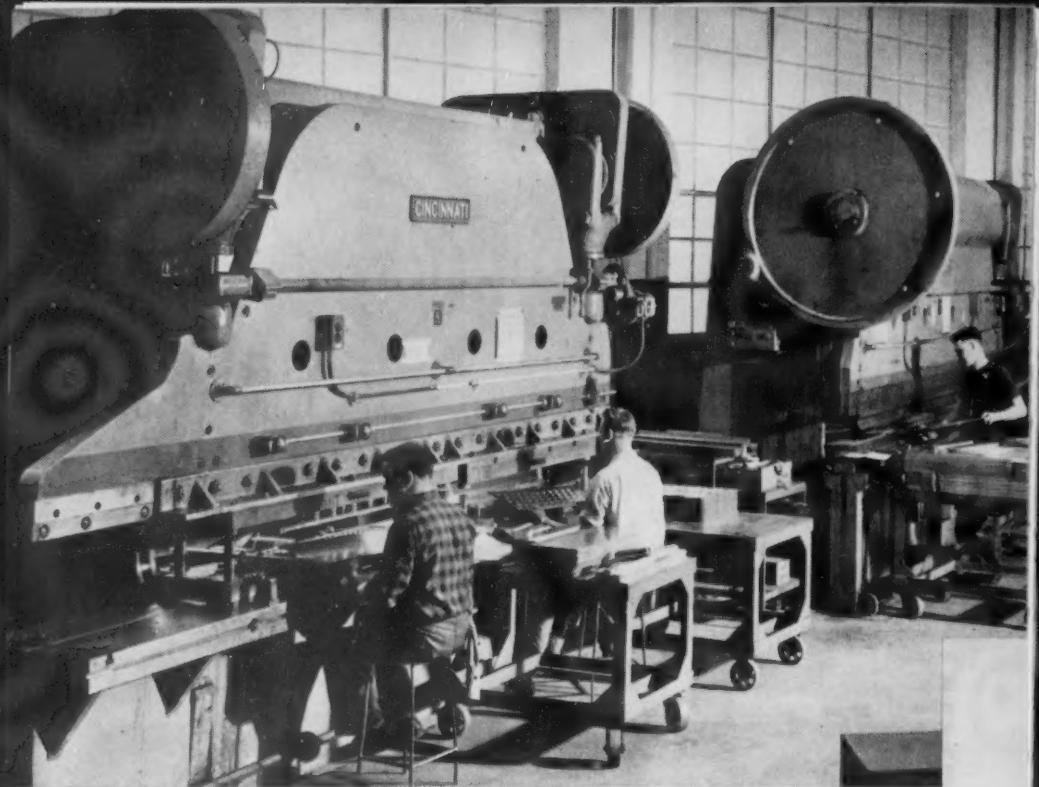


DRILLING AND REAMING. On steel forgings with a 350-400 Brinell, S.E.C.O. keeps the drills cool...gives clean cutting action.

INDUSTRIAL PRODUCTS DEPARTMENT
SUN OIL COMPANY
PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY, LIMITED, TORONTO AND MONTREAL
For more data circle 281 on Reader Service Card





BATTERIES of *accurate*
CINCINNATI Shears
and Press Brakes

*cut production
costs*

at THE TRANE COMPANY, La Crosse, Wisc.



Steel tube support plate for cooling coils.

Three Cincinnati Shears and four Cincinnati Press Brakes are profitable producers in this finely equipped shop.

The battery of shears produces accurate blanks, sheared to micrometer accuracy, which are later formed and pierced on the Cincinnati Press Brakes.

The photo at left shows multiple holes being pierced and extruded to a tolerance of $\pm .002$ in a steel tube support plate for Trane cooling coils. On this operation alone, floor to floor

time was cut from **3-1/3 minutes to 1/2 minute** by the use of Cincinnati Press Brakes. The speed and outstanding accuracy of these Cincinnati Machines have lowered costs and increased quality of the air conditioning equipment manufactured by this leading company.

Write **Department G** for Catalog S-7R on Cincinnati All-Steel Shears and Catalog B-4R on Cincinnati Press Brakes. We also suggest you consult our Application Engineering Department about your shearing and forming problems.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES



THE BEST MACHINE....
BUT COSTS THE LEAST

CHECK ALL THREE . . . AND YOU'LL BUY

FULMER HONING MACHINES

HONING MACHINE A	FULMER	HONING MACHINE B
19,675.00	15,290.00	36,330.00

Why buy a honing machine that costs more than a Fulmer Honing Machine? No other machine is more accurate . . . none will match the speed and ease of operation built into every Fulmer Machine.

The remarkable savings in the first cost of Fulmer Honing Machines are surprising. Figure, too, the interchangeability of parts; the convenient controls; Fulmer's speedy service and the profit-making savings because many internal honing operations take ONLY A FEW MINUTES instead of HOURS as with old-fashioned finishing methods.

Eleven models provide selection for any honing purpose. For cylinder blocks, connecting rods, blind end cylinders, hydraulic cylinders, valves, gears, etc.

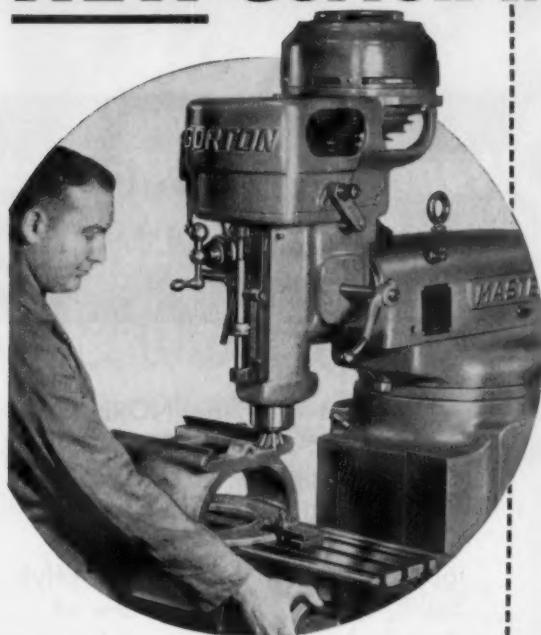
Fulmer precision honing offers accuracy up to .0001" (\pm)

Write for Bulletin on Honing to: C. A. Fulmer Co.,
Dept. S 105 E. Fourth St., Cincinnati 2, Ohio.

FULMER honing equipment

For more data circle 284 on Reader Service Card

NEW Gorton Mastermil



For . . . Milling, boring, duplicating in tool rooms, model shops, pattern shops, production lines, general machine shops, experimental laboratories, machine shops, schools — wherever high-speed vertical milling is done.

Also available . . . Infinitely variable spindle feed from $\frac{1}{4}$ inch to 8 inches per minute.

Infinitely variable table feed (longitudinal) in 4 ranges: from $\frac{1}{2}$ inch to 60 inches per minute.

Ask for special bulletin, No. 2699, on new Gorton Mastermil and for general catalog, 1701-1655, covering the entire Gorton line.

- PRECISION SPINDLE;
10 SPEEDS, 80-5600 R.P.M.
STANDARD
- DESIGNED AND BUILT TO
PROVIDE SUSTAINED
ACCURACY
- LONGITUDINAL FEED,
22 INCHES
- SADDLE LENGTH, 24 INCHES
- CROSS FEED, 10 $\frac{1}{2}$ INCHES
- VERTICAL FEED OF KNEE,
15 $\frac{1}{4}$ INCHES
- SPINDLE FEED, 4 INCHES



GORTON MACHINE CO.

GEORGE GORTON MACHINE CO.

1701 RACINE STREET

RACINE, WISCONSIN

SINCE 1893

Tracer-Controlled Pantographs, Duplicators—standard and special... Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

For more data circle 285 on Reader Service Card

A 8732-1PA

January, 1957

modern machine shop 89



Want to Save Money in YOUR Tool Room?

Then get a handy NORBIDE Dressing Stick* from your local Norton distributor. You'll find it's just the thing for cleaning up a wheel face, forming a radius or touching up a tool wheel in a jiffy! You'll find too that with one of these light, easy-to-grip sticks you can see more of the wheel face and avoid costly overdressing. And it will cut dust nuisance too. Better yet, a NORBIDE Stick of Boron Carbide — the hardest man-made material commercially available — will outlast hundreds of ordinary sticks. Order one today or write for Form 1567 giving more details.

*Actual size ($\frac{3}{8}$ " x $\frac{1}{2}$ " x 3")

NORTON COMPANY, 47 New Bond Street, Worcester 6, Mass.

NORTON
BORON CARBIDE

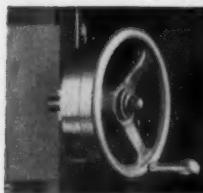
*Making better products...
to make your products better*

For more data circle 286 on Reader Service Card

FOOTBURT

Accurate grinding for small parts

■ The Hammond No. 2, 6" x 18", Surface Grinder is a precision tool room machine for use on the most accurate gauge and tool work. The standard spindle is direct motor driven and is mounted on precision preloaded ball bearing. Total vertical adjustment is $10\frac{3}{4}$ ". In and out movement of table is $6\frac{1}{2}$ " with a longitudinal travel of 18".



ACCURATE SPINDLE ADJUSTMENT—Standard vertical adjustment of spindle through hand-wheel is .0005". With Vernier attachment, spindle can be raised accurately to .00005".



SOLIDLY SUPPORTED SPINDLE CARRIER—Spindle carrier is moved vertically on double dovetail ways with adjustable tapered gibbs.



CONVENIENT HAND CONTROL—Handy wheels for cross travel, accurately gauged to thousandths, and quick acting longitudinal travel.



SMOOTH ROLLER CHAIN TABLE DRIVE—Remarkably smooth finish on work without chatter marks frequently found when table is moved by conventional means through rack and pinion.

Write or wire for further information.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio • Detroit Office: General Motors Building

FOOTBURT

SURFACE GRINDING

For more data circle 287 on Reader Service Card

OVER THE EDITOR'S DESK . . .



OPTIMISM PREVAILS

If we had at our disposal a device for measuring the accumulation of opinion gleaned from the reports which the year end brought across our desk, I am sure that such a measurement would definitely reveal a preponderent feeling of optimism toward business conditions for this year of 1957. The reelection of President Eisenhower last November brought comment from the president of the Chamber of Commerce of the United States, John S. Coleman, indicating that he could see nothing in the election results which would change the expectation of good business conditions ahead. At the time, he confidently predicted that the gross national product of \$414 billion for 1956 would rise as high as \$450 billion in 1957.

Joseph F. Owens, Jr., speaking as president of the American Machine Tool Distributors' Association, states that on the basis of the present expansion plans of the manufacturing industries they serve in their respective areas, most distributors forecast their 1957 total shipments will at least maintain 1956 levels, and might increase from 5 to 25 per cent over 1956 in regions

where continued expansion is in sight for metalworking, electronics, electrical equipment, aircraft, automotive, petroleum and chemical industries. Shipments of machine tools in the first 10 months of last year amounted to \$719 million, compared with \$670 million for the entire year 1955.

Continued improvement in construction activity is seen by the Departments of Commerce and Labor, which predict that 1957 construction outlays for the nation as a whole will reach \$46.5 billion, compared with \$44.1 billion for 1956.

The majority of reports reaching our desk give very little indication of a slowing up or a downward trend for business during the next twelve months.

★ ★ ★

TOOL CONFERENCE

Electrical Engineers involved in the many and varied electrification problems as they relate to the construction, operation and maintenance of machine tools freely exchanged ideas at the Eighth Annual A.I.E.E. Conference on Machine Tools held several weeks ago in Cincinnati. The primary purpose

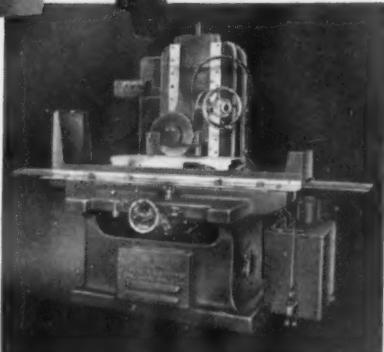
FOUND WHERE AIRCRAFT POWER AND CONTROLS TAKE SHAPE



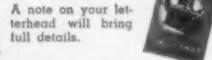
GRAND RAPIDS GRINDERS



SUPER SABRE F-100
NORTH AMERICAN
AVIATION, INC.



GRAND RAPIDS NO. 55 HYDRAULIC FEED SURFACE
GRINDER. Table speed up to 125 fpm. Working sur-
face of table is 12" x 36". Vertical movement of wheel
head is 18". Preloaded ball bearing spindle greased
for life. Spindle speeds 1925 and 2500 rpm.



A note on your let-
terhead will bring
full details.

GALLMEYER & LIVINGSTON COMPANY

408 Straight Ave., S.W., Grand Rapids, Michigan

OVER THE EDITOR'S DESK . . .



of this yearly Conference is to attempt to achieve greater productivity and safety of machine tools through electrification, to raise the American standard of living, and to aid in the common defense of the country.

The Cincinnati Conference, sponsored jointly by the A.I.E.E. National Subcommittee on Machine Tools and the local section on A.I.E.E., was devoted largely to technical papers dealing with techniques of automatic control of machine tools by use of punched cards, punched tape and magnetic tape. These methods of control bid fair to create a revolution in metal cutting machines during the next decade.

★ ★ *

MAXIMUM USE

Speaking before a recent conference of the National Metal Trades Association, Thomas R. Rudel, president of Rudel Machinery Company, observed that the "built-in" versatility of modern machine tools is one of industry's most valuable aids in diversifying its products. Elaborating on this observation, Mr. Rudel emphasized that many modern plants, particularly those in which obsolete tooling has been regularly replaced and improved, have a host of machine tools whose capacities and poten-

tial are not being fully used. He urged management to consult regularly with representatives of tool makers, plant tool engineers and machine tool supervisors and operators in planning for product diversification.

Careful examination of existing tooling in many cases has shown that it is flexible and versatile enough to be adjusted and adapted to many new product uses — with comparatively modest investment for new components, fixtures and accessories.

★ ★ *

THE BUILDERS MEET

The recent three-day meeting of the National Machine Tool Builders' Association in Chicago ended on a high plateau of optimism as Louis Polk, president of the Sheffield Corporation and outgoing president of the Association declared that approximately a billion dollars per year on the average, both in shipments and new orders, can be a practical continuing probability for the machine tool industry.

Discussing the growth factor of the machine tool industry by comparison to that of industry as a whole, Mr. Polk pointed out that while the country's gross national product climbed from \$285 billion in 1950 to an estimated \$408 billion last year, machine tool industry shipments climbed from \$305 million in 1950 to approximately \$860 million in 1956. These figures significantly indicate that the machine tool industry in the last five years has increased its annual vol-

eighteen identical APEX insert bits...



- Here are eighteen Apex 440-2 insert bits for No. 2 Phillips recess.
- Each bit fits perfectly into the screw head recess, gets a firm purchase to drive the screw smoothly and easily.
- Every bit is precision-built of special shock-resisting steel, and is notched at the hex corners to accept the patented bit retaining ring found only in Apex bit holders.

...for eighteen different screwdriving jobs

These eighteen Apex insert bits are identical, except that each one has been hardened through one of three basically different heat treatments, then tempered to meet one of eighteen totally different application requirements. These varying degrees of tensile strength and Rockwell C hardness provide the proper combination of toughness and hardness, insure greater resistance to impact, fatigue and wear. That's why Apex bits last longer, drive more screws, help reduce screwdriving costs.

Selection of the correct Apex bit for a specific screwdriving application is controlled through the complete records Apex maintains on each customer's requirements. You can select Apex insert bits exactly tailored to your requirements, to drive Phillips, Frearson (Reed & Prince), Slotted, Clutch Head or Socket Head screws. Apex—the authority on fastening—offers a complete range of screwdriving tools for manual or power operation. Write on your company letterhead please, for Catalog 21.

APEX

THE APEX MACHINE & TOOL COMPANY
1027 S. Patterson Blvd. • Dayton 2, Ohio

ATLANTA • BALTIMORE • BATON ROUGE • BIRMINGHAM • BUFFALO • CHARLESTON
CHICAGO • CLEVELAND • COLUMBUS (Newark) • DALLAS • DAVENPORT • DENVER
DETROIT • HOUSTON • INDIANAPOLIS • KANSAS CITY • LOS ANGELES • LOUISVILLE
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PHILADELPHIA • PITTSBURGH • PROVIDENCE • ROCKFORD • ST. LOUIS • SEATTLE
SHREVEPORT • SOUTH BEND • SYRACUSE • WICHITA

For more data circle 208 on Reader Service Card

OVER THE EDITOR'S DESK . . .



ume at a rate twice as rapid as the overall growth of our total national economy.

Both Mr. Polk and Tell Berna, retiring Executive Vice President, stressed the need for a continuing program of modernization in the machine tool builders' plants as well as the machine tool users' plants. Such a program becomes a necessity when the higher precision capabilities, the longer precision life, and the greater production rates of recently developed equipment are considered. Special emphasis was placed on the fact that all those who utilize machine tools are today pioneering a great new age of productivity and growth for America.

★ ★ *

Letters to the Editor:

Cannulae

Would you have any knowledge of a machinery manufacturer who has made or is making automatic or semi-automatic machinery to produce cannula. A cannula is a small tube of metal designed for insertion into a body cavity, as for drainage. The material used in making cannulae is stainless steel tubing. It is cut to lengths of from $\frac{1}{4}$ inch to 3 inches, the gauge ranging from 30 to 15 and the wall thickness ranging from 0.0035 inch to 0.010 inch.

It would be preferable to have the equipment produce a keen point at each end, free of burrs and clean inside and out. If a double point is not feasible then there should be a keen point at one end and a right angle cut at the other. We would appreciate any information you can give us on this subject and thank you very much for your consideration.

C. W. Krauskopf
Mizzy, Inc.
Clifton Forge, Virginia

● One company who might be able to help you is The Torrington Company, 730 North Street, Torrington, Connecticut. Also, from among the readers of MMS may come the answer to your problem.—Ed.

Drill Feed

We would appreciate descriptive literature together with prices on the automatic drill feed, as described in a recent issue of *Modern Machine Shop*. This article referred to the General Pacific Corporation as producing a commercial version of the device described.

C. W. Piggott, Vice President
Dockson Corporation
3839 Wabash Avenue
Detroit 8, Michigan

● Information other than that appearing in article can be obtained direct from General Pacific Corporation, 8740 Washington Boulevard, Culver City, California.—Ed.

Tooling

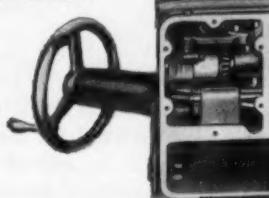
In the August 1947 issue of *Modern Machine Shop* there was an article entitled, "Tooling the Auto-

Clamping

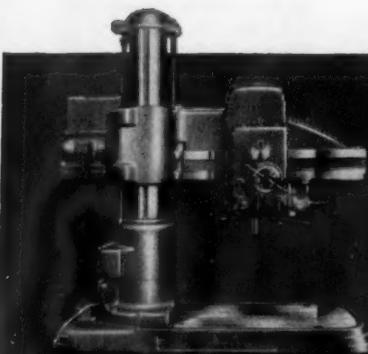
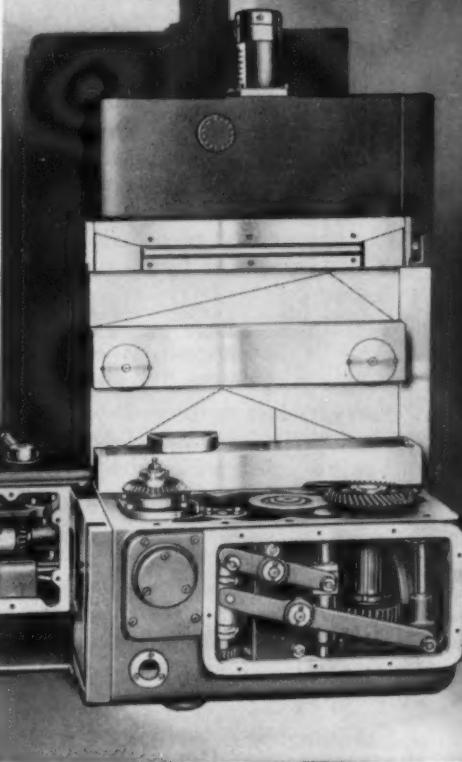
Theoretically perfection may be unattainable but practically the new Hole Wizard Head Clamp is perfect.

It not only clamps the head solidly to the arm either manually or electrically but it automatically raises the head off of the traversing rollers, thus relieving them of all clamping effort and binds it solidly to the arm.

When the clamp button is pushed or the clamp lever actuated, opposing tapered wedges between the arm and the head are drawn inwardly at each side of the head, thus forcing the head off of its roller bearing on the arm way and wedging it solidly against the bottom surface of the arm. This clamping and unclamping action is instantaneous and sensitive and adds another plus feature to the "AMERICAN" NEW HOLE WIZARD.



Perfection



Plus features

Speaking of Plus Features here are a few you will want in your next radial.

- Centralized Control.
- Lightning-fast Direct Reading Speed Change.
- Nitrided Spindle and Sleeve—practically wear proof.
- Timken mounted column unit defies deflection.
- Raybestos covered, spring steel tapping attachment friction bands, quick acting, wear proof, permitting 40% speed-up for spindle reverse.

These are just a few...
learn the others from bulletin No. 328

THE AMERICAN TOOL WORKS CO. Cincinnati 2, Ohio, U. S. A.

LATHES AND RADIAL DRILLS



matic Screw Machine" which was indicated as Part 19 of a series. We would appreciate your advising us whether this article and those which apparently preceded it are available in reprint form.

N. L. Boyle
Western Electric Company
100 Central Avenue
Kearny, New Jersey

- Sorry, series appeared between November 1941 and December 1947 and supply of reprints available at that time exhausted.—Ed.

★ ★ ★

Please Send Me:

Modernize

I thoroughly enjoyed the article, "Modernize Your Shop and Save Money" by Jack Bedford in the October issue of *Modern Machine Shop*, and wonder whether we would be able to obtain ten additional copies of this article.

R. Bellgrau, Vice President
Hicks Machine Tool Company
673 South Cooper Street
Memphis 11, Tennessee

Quest

In the September, 1956, issue of *Modern Machine Shop*, I read the article titled "The Quest for the One Best Way" by W. A. Nordhoff.

If it is at all possible to obtain reprints of the article, please send to my personal attention at your earliest convenience eight copies.

Frank P. LeRoy
Methods Engineering Supervisor
Clearing Machine Corporation
Hamilton, Ohio

Keying

I am interested in obtaining a copy of the article, "Keying by the Woodruff Method" which appeared in the October and November issues of *Modern Machine Shop*.

George B. Cranston
Engineering Products Division
Radio Corporation of America
Camden 2, New Jersey

Would you please be kind enough to send to the attention of the writer the articles on Keying by the Woodruff Method by Fred Rogers which appeared in the October and November issues of *Modern Machine Shop*.

Herb Harrison, Eng. Dept.
Barber-Greene Canada Ltd.
P.O. Box 40, Station J
Toronto 6, Ontario

We would like to obtain twelve copies of the article "Keying by the Woodruff Method," which appeared in the October and November issues of *Modern Machine Shop*.

H. Wineman
American Chain & Cable Company, Inc.
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OVER THE EDITOR'S DESK . . .



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Special Machine Shop for

To cut costs, major aircraft producer has installed specialized machine shop for producing small parts with minimum of tooling and paperwork.

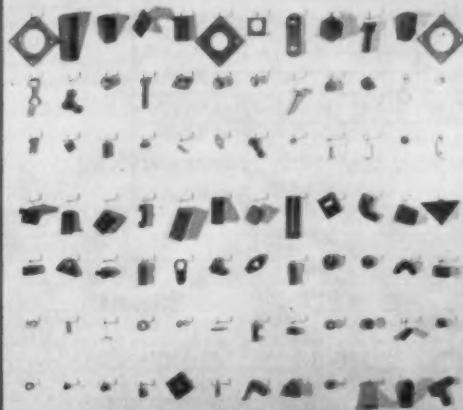
By GILBERT C. CLOSE
Field Editor

A small but versatile machine shop for producing small parts only is proving very economical and effective at the El Segundo Division of Douglas Aircraft Company. Although the small shop operates under the same roof and cooperates

to produce the same products (Naval military airplanes) as the major machine shop, this about sums up the connections between the two. There is no interchange of paperwork, parts, or production work between them. They are under sepa-

(Above) View of the "profiler" area in the Douglas small parts machine shop. The pantographs employed in this shop have proved very useful in small parts production.

(Right) Typical parts produced in the Douglas small parts machine shop. Work size must fall within a maximum of 3 inches along any two dimensions.



Small Parts Production

rate supervision. If one of the shops had to close down for some reason, the other could continue to produce without a hitch in its operations.

This sharp division of activities is necessary to obtain the desired results. "Aircraft machine shop production work has always been hampered by the necessity of producing a large number of short-run orders of relatively small but high precision parts," says R. J. Delaney, supervisor of the small parts machine shop. "When these short-run orders of small parts were produced in the main machine shop, they required just as much paperwork, set-up time, supervision, inspection time, and so on, as large

parts. At the same time they tied up huge and costly machines that could work more economically and efficiently on large and valuable parts. And often it was just as expensive to tool these big machines for small parts production as to tool them to produce a large precision part."

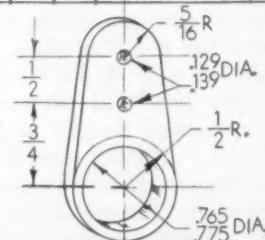
Four major goals were established when setting up the small parts machine shop: (1) to reduce paperwork to a minimum; (2) to provide sufficient machine versatility so that any type of work could be accomplished on any type of material as long as the part was in the small-parts category; (3) to make shop tooling complete enough

Small Parts Production . . .

MANUFACTURING OUTLINE				SERIAL NO.	PAGE 1 OF	PART NO.			
FORM ES65-37X (10-58) PART CONTROL INSTL CATAPULT NAME GUIDE - HANDGRIP & THROTTLE						5381567-81			
DEPT.	SPLIT QTY.	DATE	ORDER NO.	SHOP ORDER	JOB NO.	QTY.	DEPT.	LET.	DU DATE
					42				
				DATE PLNR. KON LEE	TOTAL SPECIAL REMARKS	402	B		
ORDER TYPE CF 2	PART TYPE 18	CUSTOMER INSPECTION							
		ITEM	ITEM	ITEM					
PART NUMBER "L"				STAMP	STAMP	STAMP			
STANDARD REMARKS:									
TOTAL COST		COST	UNIT	CONV. FACTOR	POSTED	CHG. NO.	SECTION	POS.	
MATERIAL 1/8" X 2 1/4" X 1 1/8"		(20")	L/L MAKE 16 PTS			4064		PER PLANE 1	
LAM PHENOLIC NAT SEMI GLOSS SHEET									
MIL - P-15035 TYPE FBM									
ITEM	DEPT.	AREA	INSTRUCTIONS	POSITION	RUN SET-UP	OPER &	INSPECTION	TOOLS	TOOL
			ASSEMBLY PARTS LIST		REQD.	TYPE EQUIP.	QTY. DATE STMP.	REF. ASSEM. NO.	CODE
1	402		SAW TO 1 1/8 ± 1/32 WIDTH DIM. & SQ.		19-2			NT	
2									
3	402		DRILL #29/130 DIA. (2) HOLES		3-S			1B65-DJ 1#	
4			U'SIZE TO #40 PILOT HOLE					1#40(0980)DRILL	
5			DRILL #65/775 DIA. (1) HOLE						
6			U'SIZE TO 3/4 DIA.					3/4 (7500)DRILL	
7			(FOR REAMING)						
8									
9	402		MILL CONTOUR OUTSIDE		218-4			1B65-MEP1 1#	
10			PERIMETER COMPLETE						
11									
12	402		REAM #65/775 DIA.		3-S				
13									
14	402		DEBURR			9			
15									
16	402		IDENTIFY-TAG			2			
17						INSP			
18	INSP		MACHINING						
19	402		380						
20	402		SHIP TO 517 S/R						
1	% CREWRITTEN FOR CF2 SHOP			KON LEE			5381567-81		
ED. RECEIPT NO.	RECEIPT DATE	CHG. NO.	REMARKS	DATE & OUTLINED	DATE & CHECKER	TAB	ENGINEERING DUE DATE		

Typical work order as used in the small parts machine shop, containing all required data and a drawing of the part to be made. This single work order is the only paper-

work involved in production. It remains in the small parts machine shop, even after the job is finished, so that it is always readily available for re-orders when needed.

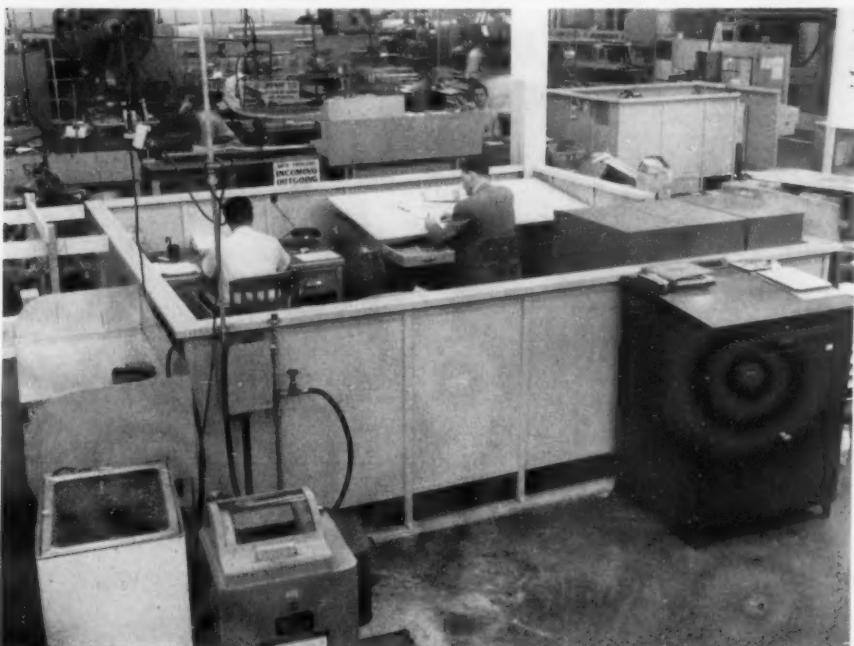


so that every job could be carried through from raw stock to a finished part ready to install on the airplane (including cleaning, deburring, painting, anodizing, and so on, whenever necessary); and (4) to make the small parts machine shop completely independent from all other factory production operations.

It may be noted from the above paragraph that goals (1) and (4) are interdependent as the simplified paperwork on an order going through the small parts shop would not serve when that order had to be routed through other production departments. Similarly, goals (2) and

(3) were necessary so that every part could be completely finished in the small parts machine shop and thus avoid further production routing. When an order leaves the small parts machine shop, the parts must be ready for installation on the airplane.

The simplification of paperwork starts with the inception of the work order. Only one copy of the work order is produced. Along with the usual information, this work order (written on a stiff, 8½-inch by 11-inch sheet) contains a detailed drawing of the part, the number of parts to be produced, and



All the necessary paperwork for producing parts in the Douglas small parts machine shop is originated by the two men working in the small "penned off" area shown in

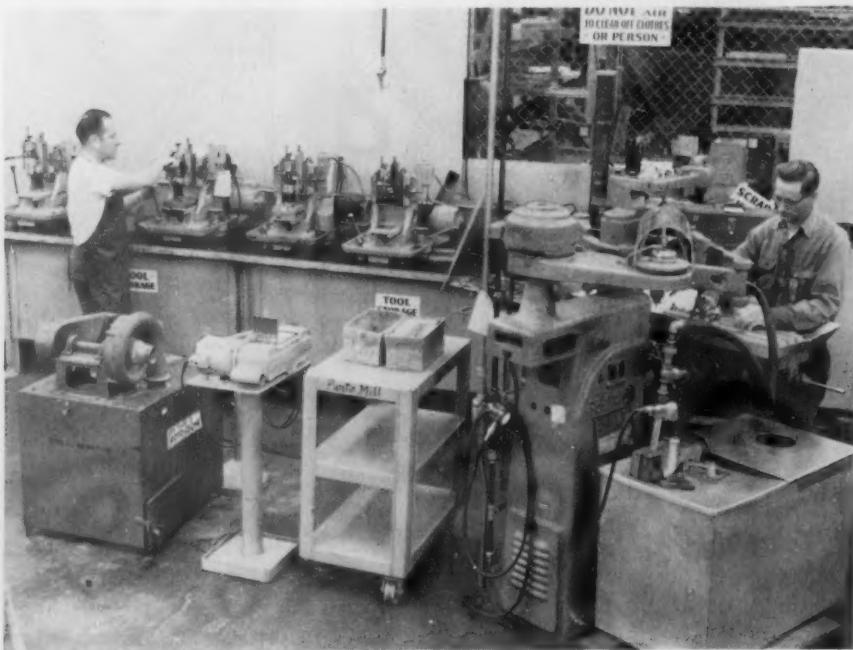
the above illustration. When great speed is required in turning out a job, the part can be produced from the original layout at the same time the work order is being written.

"The order may be worked on at any time prior to the due date . . ."

the due dates. Everything needed to produce the part is included. This work order is then filed in the "Active" file and remains a "live" job until it is finished. When the required number of parts have been produced, the work order is removed from the "Active" file and placed in the "Jobs Finished" file.

This extreme simplification of work order data and handling has several advantages over and beyond savings on paperwork costs.

All jobs in the "Active" file are ready for working at any time when men and machines are available. While it is necessary to have all parts (or a portion of the work order) ready on a specified due date, nothing prevents completing a work order before the final due date. The order may be worked on at any time prior to the due date, and, because of this desirable flexibility, many orders are finished and delivered well in advance of the due date.



Profiling a stainless steel part which has been chilled to 50 degrees below zero. Chilling tank (dry ice solution) is at lower right.

It would be impossible to profile stainless steel on this high-speed machine at room temperature because of the heat involved.

Secondly, when a work order is finished and moved into the "Jobs Finished" file, it still remains in the small parts machine shop, and, when orders come through for spares, extras, or to replace parts that have been broken or lost, the work order is merely transferred back into the "Active" file. No extra paperwork at all is required to cope with these emergencies.

Tooling in the small parts machine shop is but an extension of what might be found in a home mechanic's well-equipped "do it yourself" shop, and the employees who use these tools are trained to think along the "do it yourself"

line. Jobs are constantly being turned out on small lathes, pantographs, and band saws. These jobs, if produced in the main machine shop, would be accomplished on jig benders, Hydrotels, and huge mills, along with a costly array of specialized tooling.

"We limit our work to jobs which fall within 3 inches along any two dimensions," Delaney says. "Many of these parts must be produced to critical machine shop tolerances, but as they are small and light, and because we have time to be critical without tying up a large and expensive machine, we have no trouble in meeting these small tolerances."



View of the miniature metal cleaning, processing, and painting area of the small parts machine shop. Note tiny conveyorized bake

oven at left, tiny paint booth (rear center), and metal cleaning tank made from a dish-washing machine (right foreground).

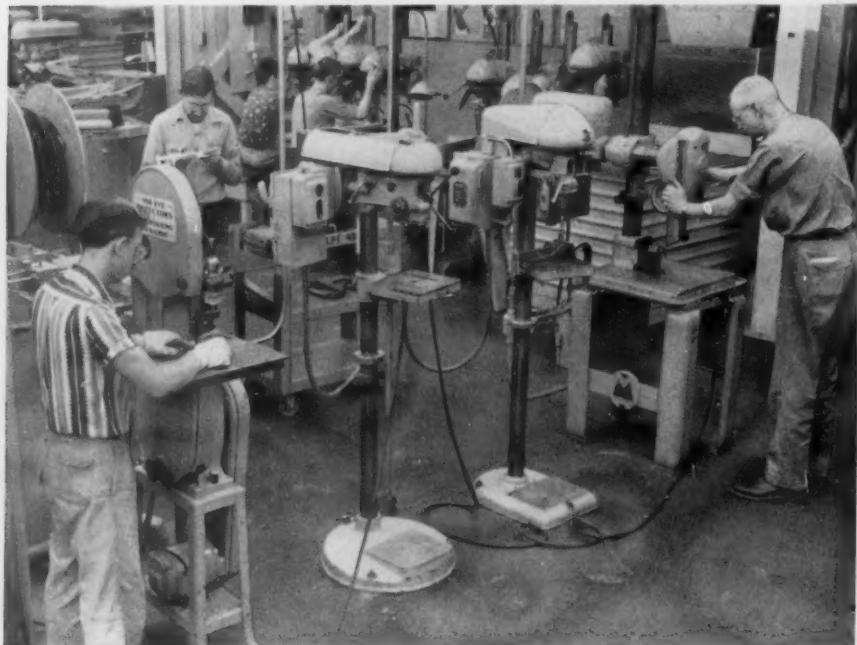
"Most machine tooling consists of small holding fixtures and guides . . . fabricated just before the job is started."

Most of our machine tooling consists of small holding fixtures and guides; some of it is almost spontaneously fabricated just before the job is started. And in most cases, the tools and fixtures are low-cost items well in keeping with short-run production work."

Representative machines in the small parts machine shop include table and band saws modified with guides and holding fixtures, a small horizontal and a small vertical mill, a pair of Hardinge turret

lathes, some small engine lathes, a Burgmaster turret drill with six spindles, deburring equipment, small anodizing and Iriditing tanks for aluminum parts, a miniature degreaser, and a metal cleaning set-up made from a modified dishwashing machine.

Four Gorton pantographs are the backbone of many small parts production jobs. "It would make most machinists flinch just to see how we use these pantographs," Delaney says. "For instance, we route



View of the drill press and band saw section of the Douglas small parts machine shop. Most of the machine tools in this section are very small in design but highly versatile.

out many small stainless steel parts on a high-speed pantograph. Normally, this would be impossible due to the friction and heat produced. But by lowering the temperature of the stainless steel to approximately 50 degrees F. below zero just prior to working, it cuts easily and without enough heat to produce a blue chip. Cooling is accomplished in a dry ice cooling solution kept in a tank adjacent to the pantograph, and this coolant is circulated over the part while being machined."

The pantographs are used also for routing small sheet metal parts. Many small parts are sawed out on a band or table saw when the cut

edge does not require extreme smoothness. Other parts comprising a short-run order are literally "hand made." These same parts would require expensive tooling if produced in a conventional manner, thus "hand" production of a small order may result in a tremendous overall saving.

"A special type of employee is needed for this type of work," De-laney says. "Extensive machine shop experience may be more detrimental than helpful, as the experienced man thinks in terms of 'big' production work. We try to obtain (or to train) employees that think along the 'do it yourself' line—



Three small engine lathes at work. Intricate parts can be literally "hand made" on the machines available, eliminating the cost of expensive tooling for short-run orders.

"... every employee is made aware he is producing a critical part for a critical airplane . . ."



Milling and deburring operations are accomplished in this area of the small parts machine shop. Employees are trained to view each job with a "do it yourself" attitude.

men who although they don't know how to do a job, will go ahead and do it anyway and do it right. It's surprising how such fellows can think up unheard of methods to accomplish the desired results. And we don't impose restrictions as long as results are forthcoming."

This self-reliant attitude is a great moral booster, according to Delaney, and results in better shop cooperation and pride in work than could ever be achieved by conventional "bossing." At the same

time every employee is made aware he is producing a critical part for a critical airplane, and criticizes his own judgment accordingly.

A final advantage of a small shop status in a huge factory is that any number of corners may be cut to produce a part when it is needed. "We can start work even before our local work order is produced, merely by working from the original layout. We can 'hand produce' a part in a few hours that might require weeks of specialized tooling to pro-

duce on a conventional machine. We can start work on spares and replacements covered by finished work orders immediately, merely by pulling the old work order out of the "Jobs Finished" file. This follows through on the tooling for the parts which is so small and inexpensive that it is merely stored on a convenient shelf when the job is completed. And usually, we store a few extra parts along with the tool just to take care of these emergency orders."

The economical success of the

Douglas small parts machine shop is perhaps best emphasized by the fact that the company is now planning to install complete small-parts production lines in its Torrance, California facility. This small parts production line will be patterned very much after the small parts machine shop described in this article. Every provision will be made to cut paperwork to a minimum, cut costs, and cut the "red tape" that more often than not proves to be the worst type bottleneck that a production machine shop can encounter.

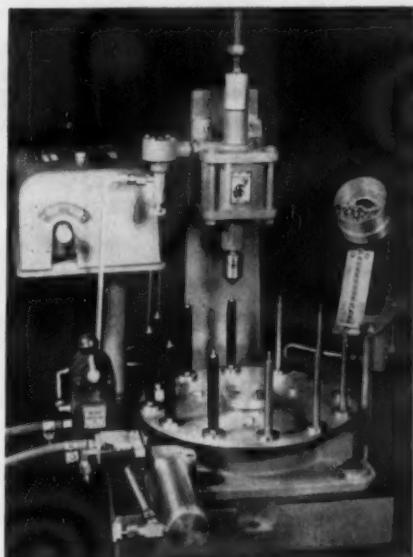
* * * * *

Air-Operated Crimping Setup

In the setup shown in the accompanying illustration, an air-operated rotary work feeder is combined with a pneumatic timer, an air press and a miniature hopper to crimp eyelets and rings on the barrels of fountain pens. All units are mounted on a standard Mead "Universal" base to form a semi-automatic machine; the operator merely keeps the hopper and dial loaded. The pen barrels are held on twelve special studs around the rim of the dial, where they are placed by hand over the eyelet which has dropped on the stud from the hopper. At the work station a single-acting air cylinder, with crimping tool attached to ram, presses the components together. This cylinder has an upper ram with threads and lock nut to stop the downstroke at exactly the right point. The Meadmatic Timer, a self-contained unit mounted on a post convenient to the operator but out of

the way, controls the number of cycles per minute in addition to the length of the "dwell."

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Air-operated setup for crimping eyelets and rings on the barrels of fountain pens.

COST REDUCTION Through Proper Design

Intimate knowledge by the designer of machining operations to be performed on various parts involved in an assembly is of great importance for controlling cost.

By FRED ROGERS

The creating and designing of machines and workable mechanisms are only part of the duties of a design engineer. In actual practice, an intimate knowledge of machining operations to be performed on a single part or on many parts is of great importance in the matter of controlling cost. Then too, the alert designer can save the machinist innumerable headaches by paying close attention to the so-called insignificant details. It is the little-thought-of details that usually make

the difference between ease of machining and the high cost of rehandling, remachining, tool breakage, or a variety of other salvaging endeavors.

Many times, a cost-cutting design detail will get by a drafting room checker. The pattern is then made where castings are involved, and these castings are machined the hard way before the machine shop or the methods department requests that a revision or even a replacement be made for greater ease of machining. The suggested change, of course, is conducive to labor and cost savings. But it costs time and money to make the changes and for the records to be altered. The time to catch these inconsistencies is on the drafting board, long before they reach the methods department, the pattern shop, the machining or assembly departments.

Most parts, whether for machine tools, engines, automobiles, airplanes, household equipment, die-cast mechanisms or numerous other pieces of equipment have various

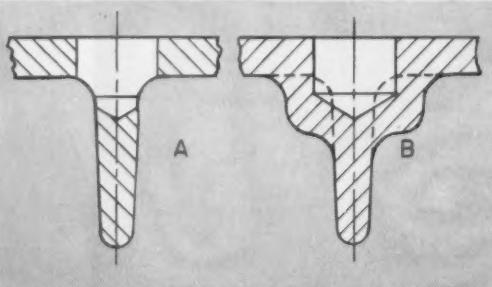


Fig. 1 (A)—A shallow hole is machined into a rib of the casting. (B)—A round boss of generous proportions should be provided around the drill point of the hole.

"When a designer locates a tapped hole near the wall of a casting, the tap will break through on a radius . . ."

types of holes machined in them. This article will discuss some of the situations encountered in the shop which involve drilling, counter-drilling, reaming, tapping, counterboring and spot-facing. These operations are performed mostly in the drilling department or at the stage of final assembly of the finished product. The effects of oversights on the part of designers in working out details of the various components comprising the finished product will be illustrated and suggestions made to remedy them.

At A in Fig. 1, a shallow hole is drilled into a rib of a casting. This hole might be centrally located, as shown, or situated off to one side. Regardless, this design is bad for several reasons. The drill must break through partially into space and drill breakage may occur. If the rib is vital to the stability of the

casting, as might be supposed, it will be weakened by the breakthrough, possibly to the point of a fracture. It would be better to relocate either the rib or the hole. If neither is possible, then the design should be changed to that shown at B in Fig. 1. A round boss of generous proportions should be provided in the area around the drill point of the hole.

When a designer locates a tapped hole at or near the wall of a casting, as shown at A in Fig. 2, both the drill and the tap will break through on a radius and then are required to drill and tap half a hole. Such a hole invites tool breakage. A better way of designing the part would be to provide a partial boss around the hole, as shown at B in Fig. 2, in which no break-through is possible. If this bump, or series of bumps for multiple holes, is consid-

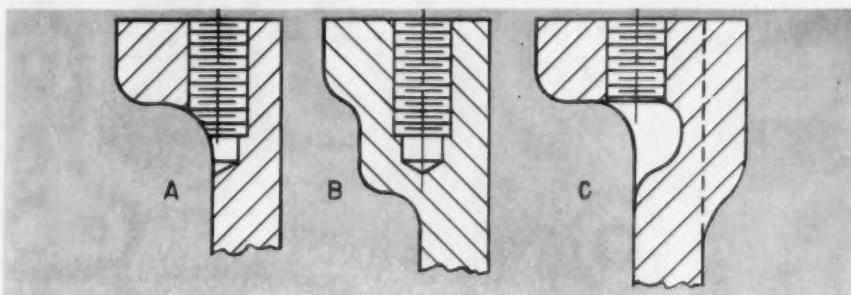


Fig. 2 (A)—When the center of a tapped hole is at or near the casting wall, the drill breaks through on a radius and then has to machine half a hole. **(B)**—A better way of designing

the part is to provide a partial boss around the hole in which no break-through is possible. **(C)**—If necessary, the wall under the hole can be recessed in the manner shown.

"Time is saved in both drilling and tapping operations because the hole is shorter."

ered as marring the appearance of the casting then the wall directly underneath the hole can be dimpled or recessed like that illustrated at C in Fig. 2. Designed thusly, the drill and tap break through evenly. Time is saved in both drilling and tapping operations because the hole is shorter.

At A and B in Fig. 2, the drill and tap must necessarily travel some distance beyond the point where the end of the screw subsequently threaded into the hole will rest. In both of these instances, only a number one or taper tap is used. Time is lost when machining such holes if a plug or bottoming tap is required. At C in Fig. 2 the vertical length of the pocket below the hole must be such that the taper tap will produce accurate threads throughout the length of the hole so that the

screw will not bind. Sometimes a tap having a length of taper midway between a standard taper and plug tap may be used which will shorten the tapping time. The thickness of metal around the recess as shown by the redesign of the wall in casting C in Fig. 2 should be the same as that of the wall, otherwise a shifting of cores or too much shaking of the pattern in the mold might leave an opening or a weak place in the casting.

Another common error in design is shown at A in Fig. 3. Here the drill not only must machine away metal formed by the radius at the lower end, but the periphery of the drill is forced to scrape against hard casting surface scale which will cause the drill to quickly become dull. The drilled hole should be located in the casting in the manner

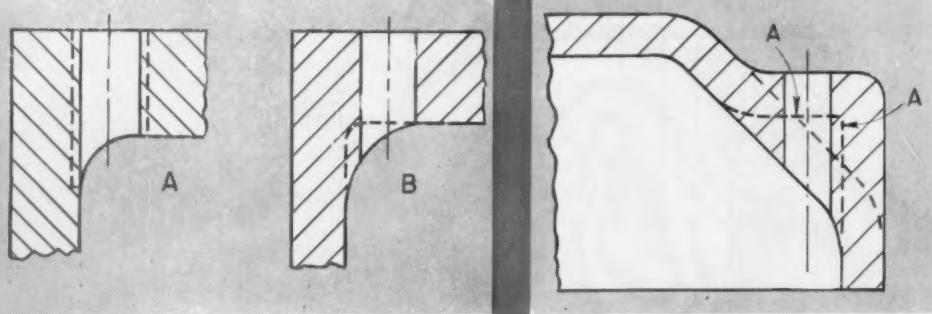


Fig. 3 (A)—In this design, drill not only must machine away metal formed by radius, but must scrape against casting scale. (B)—Drilled hole before tapping should be like shown.

Fig. 4—The wall of the casting slopes down at a 45-degree angle; therefore, a boss is provided so that the top surface may readily accommodate the hex head of a screw.

"The construction requirements are such that a holding screw must be located somewhere along the sloping wall."

shown at *B* in Fig. 3. Thus the periphery of the drill clears the wall, but it still cuts out on the radius. The dotted line in sketch *B* of Fig. 3 shows a design of casting wall which permits the drill to break through evenly. If this design should tend to weaken the corner between the wall and upper flange, then the radius can be dimpled around each hole.

In a similar vein is the construction shown in Fig. 4. The wall of the part slopes down at a 45-degree angle. The construction requirements are such that a holding screw must be located somewhere along the sloping wall. Therefore, a boss is provided so that the top surface may accommodate the hex head of the holding screw. The drill does not easily break through the 45-degree angle surface but, after it does,

it clears the inside of the wall. The design indicated by dotted lines *A-A* should have been and was later incorporated into the pattern. Drilling time was reduced markedly and drill breakage was reduced to a minimum. It should be remembered that on thin castings, gobs of metal here and there do not cool evenly when poured. The boss indicated by means of the dotted line follows the natural thickness of the piece. This, we firmly believe, is by far the best type of design.

Figure 5 illustrates an example of a drilling and reaming operation which could be greatly improved if actual machining of the part is taken into consideration. The casting is cored out with a $1\frac{1}{4}$ -inch wide recess as indicated at *A*. The drilled and reamed hole, which is 1.250 inches plus or minus 0.0005

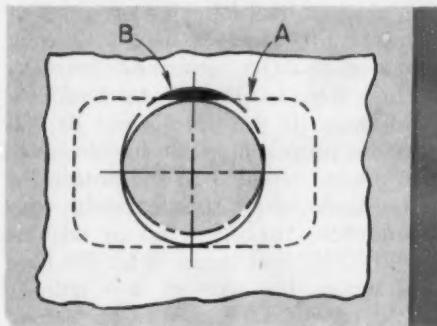


Fig. 5—Familiarity with technique involved in machining this part would have suggested to the designer that either the hole should be smaller or the cored opening larger.

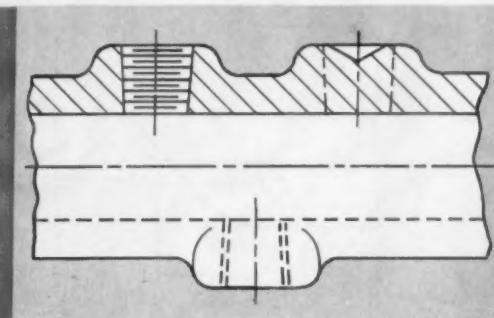


Fig. 6—In this hydraulic oil piping manifold, considerable layout time is saved due to the fact that drill point indentations are cast in the center of each boss provided on the part.

"If the hole veers off a trifle, then the drill will cut out a small segment . . ."

inch, enters this recess. If the hole hits the recess centrally, both the drill and more especially the reamer have to drag over hard scale on the two side walls of the recess. Because there is a slight taper at the end of the reamer, it must advance beyond merely the depth of the hole (in other words, the thickness of the metal) to produce a straight hole into which a plug gage may be fitted the entire length. Therefore, real damage to the cutting edges may occur. The gage may also be scratched. If the hole veers off a trifle, then the drill will cut out a small segment, as shown at *B*. This also tends to let the drill cut out hard scale on the wall of the recess as it might not cut deep enough to be well beneath the scale thickness. Either the hole should be smaller or

else the cored opening should be larger.

In a hydraulic oil piping manifold, such as shown in Fig. 6, a number of bosses are provided to receive pipes. The holes can vary in center distance up to $\frac{1}{8}$ inch if necessary. In this example, an alert patternmaker made the suggestion to place a drill point indentation in the center of each boss on the pattern and cast it that way. The casting molded smooth and clean and there was a perfect dimple in each boss in which to start the pipe drill. This simple suggestion saved laying out, scribing and center punching at the drilling department layout bench and reduced the cost of machining the manifolds a considerable amount.

When a hydraulic or lubricating oil or coolant tank must be drained, whether it be incorporated in the bed of a machine or is a separate unit, there is usually a hole provided at its lowermost level as illustrated in Fig. 7 to facilitate drainage. If the hole is not drilled in the proper place, a sizable layer of sludge remains in the bottom of the tank which immediately contaminates the clean oil or coolant refill. The best location for the hole is where the axis of the hole is aligned with the bottom surface of the tank. This means that usually a half-hole must be drilled, as shown. The best way to overcome the disadvantage of having to drill a half-

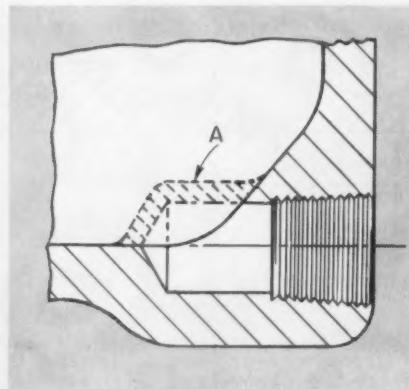


Fig. 7—Providing boss on inside surface opposite drain eliminates drilling half-hole.

"... a draftsman should understand shop procedure for without this knowledge he can easily multiply machining difficulties . . ."

hole is to indicate in the design that a boss be provided on the inside wall at the point where the drain hole is to be drilled. When the boss is drilled out, a wall about $\frac{1}{8}$ inch thick will be left, as shown at A. This thin metal is thereafter chipped away with a chisel or can be ground away with a hand grinder. The hole is taper tapped for accommodating a pipe plug or for the purpose of attaching a drain hose.

The detail shown in Fig. 8 illustrates clearly why a draftsman should understand shop procedure. A man without this knowledge can easily multiply machining difficulties and raise costs. Although only one view is shown, the head at the right is actually $2\frac{1}{2}$ inches long and rectangular in shape. The cylindrical portion at the left, which is 8

inches long, is to be ground. The part is a steel casting. The roughing operations were performed in a lathe with the part chucked at the head end. Because the designer was of the opinion that the grinding operation could be performed similarly, he drew up the part as shown in the solid outline in the sketch. It was then decided to grind the workpiece on centers.

The hole at the left was chamfered 60 degrees for a center. A combination drill center hole was placed at X. It was then discovered that a special center had to be made, the pointed end of which had to be ground down to about $\frac{5}{8}$ inch in diameter and about $1\frac{1}{4}$ inches long. This long overhang and small diameter were too weak to hold the part securely enough for machining. The

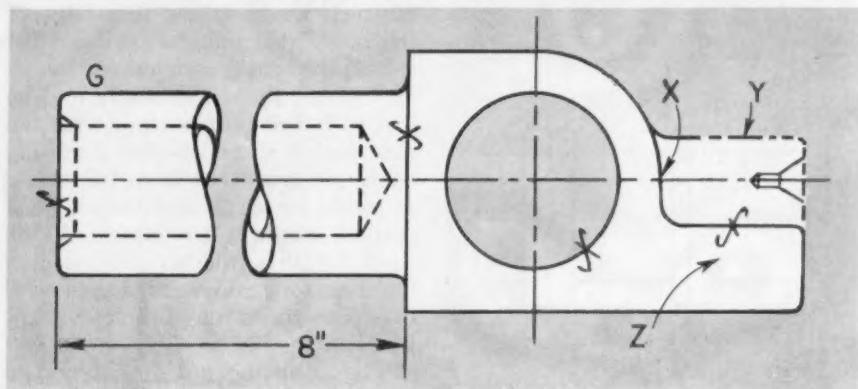


Fig. 8 — Changing the design of the part by adding a centering boss (Y) eliminated several machining problems, and also reduced the cost of making the part.

"In designing machining parts, consideration must be given to the use of jigs and fixtures . . ."

pattern was thereafter built up with a centering boss, as indicated at Y, which eliminated the specially ground down center. The surface Z had to be finished anyway and the center boss Y was milled off after grinding, even though it required a rather heavy cut. Ordinarily, it is not good practice to machine away the center holes on machine parts but in this case it was felt to be justifiable.

The cast iron piece shown in Fig. 9 was bored and reamed to $1\frac{1}{4}$ inches in diameter. The groove shown at A was cored $1\frac{3}{4}$ inches in diameter $\times \frac{3}{8}$ inch wide. The hole is $\frac{3}{8}$ inch in diameter. The groove was cast or cored in because the hole was too long to turn or bore in the recess. In this design, the drill

scraped scale as it broke through. On a revision, the hole was made longer than the groove width, as indicated at B, to alleviate drill dulling; however, drill break-through was found to be difficult. Thereafter, the width of the groove was made greater, as shown at C, and the same $\frac{3}{8}$ -inch diameter drill was used.

In the designing of machine parts, consideration must be given to the use of jigs and fixtures and how the work can be held and machined in them. The designer can make it difficult or easy for the machinist. The adjusting screw nut shown at A in Fig. 10 is a good example of such a situation. The nut is made of steel and is used with a hardened and ground screw. The designer considered it conventional that the outline of the upper end of the nut should follow the shape of the hole. This might have been because the cast component to be moved was shaped similarly and he had to follow that contour with the nut. Such a shape involves a milling operation when cut from bar stock. It might be suggested that a steel casting would fully eliminate the need for this difficult milling job; however, long deliveries of steel castings sometimes make their use impractical.

The adjusting nut is fastened to its mating piece with four screws and two dowel pins. To properly drill the holes for these screws and

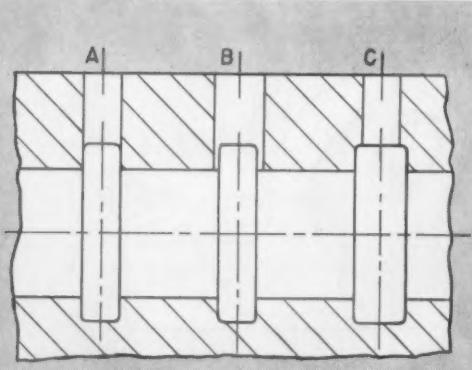


Fig. 9—Sketch of bored and reamed cast iron piece shows three hole and groove designs.

*"A saving is made in the length of stock used . . .
by the metal around the holes . . ."*

pins, starting on a rounded surface and at a considerable angle because they are well down on the radius, jig bushings with special ends as shown at *X*, have to be used. If these bushings were cut off perpendicular to their axes, there would be too much space between the end of the bushing and the work. The drill would tend to run down the radius. This applies to both the liner and the slip bushing. Therefore, 12 bushings must be made special, where otherwise these bushings could be readily obtained commercially from various jig bushing manufacturers.

Let us now consider the proposed design at *B* in Fig. 10. The rectangular steel stock is cut off and the corners are broken with a file. A sav-

ing is made in the length of stock used as readily observed by the metal around the holes at the upper end. Drills, reamers and counterbores can be started on the flat surface provided. Special bushings are eliminated. Clamping in the jig is simpler. Because the counterbore does not have to start to cut a partial hole as it does on the radiused piece shown at *A* in Fig. 10, the liner bushing can be dispensed with and the counterbore can be started without the aid of a jig. Consequently, four liner bushings might be saved. Because of the squared upper end, the pattern of the mating piece might have to be altered somewhat but then again this might not be necessary.

(To be continued in next month's issue)

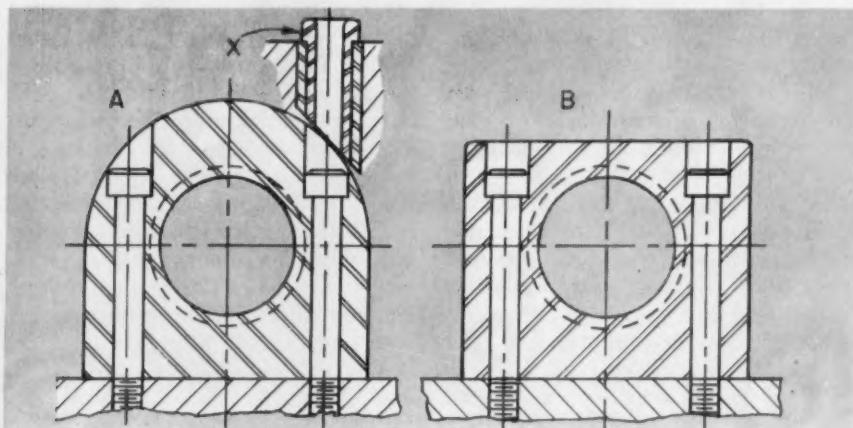


Fig. 10 (A)—Rounded surface of adjusting screw nut requires use of special drill jig bushings.
(B) — Square design proposed to overcome difficulties in machining nut shown at (A).

COST-SAVING SETUP FOR

Grinding Industrial

Leading spring manufacturer uses special tandem grinder to solve spring grinding problems.

Since many types of industrial springs, in the sizes from 1 to 2½ inches in diameter and from 1 to 3 inches long, have to be ground flat on the ends for more precise performance, a leading Midwestern manufacturer prefers to supply his springs ground, ready for use. After years of research, using various types of grinders, the engineering department of the firm settled on the idea of having a double, or tandem, machine developed specifically to perform the heavy grinding operations on the ends of the various springs.

After much cooperative work between the engineering staffs of the spring manufacturer and the Besly-Welles Corporation, which was given the job of manufacturing the machine, a tandem special grinder was produced as "the answer" to these spring grinding problems. This machine utilizes two pairs of grinding discs, diametrically opposed and separately powered and driven. A feedwheel moves pieces to be ground between each pair of discs in suc-

cession in one revolution. In other words, this machine roughs and finish grinds in one controlled operation. The first pair of heads carry roughing discs for removing metal. The second pair of heads grind the parts to the desired finish and tolerance. Since installation of the grinder a year and a half ago, production on the spring grinding operation has doubled, costs have been cut one-third and one operator now does, with less fatigue, the job of the two operators that were previously required.

In the setup shown in the accompanying illustration, springs are fed into a hopper from an overhead chute. They are then placed into specially-designed flat holders, the holes and thickness of which vary in size according to the diameter and length of the springs. As the feedwheel rotates, the first pair of 30 inch solid abrasive discs rough grind both ends of the springs at once, removing 0.100 inch of material. Further along in the same rotation, a second pair of 30 inch solid abra-

Springs

sive discs finish grind to a tolerance of 45 lb. plus or minus $2\frac{1}{4}$ lb., removing 0.030 inch of material. A total of 0.130 inch of material is removed in one pass through the machine. Springs are automatically unloaded into boxes through an

opening at the end of one complete feedwheel revolution. Roller conveyors are employed to carry the full boxes on to the next operation of shot peening.

A special feature of this grinder is the orbital grinding action produced by an eccentric type feedwheel. A combined oscillating and rotating motion causes the work to travel in a wave-like pattern across the face of the discs. This particular process exposes a maximum number of abrasive cutting edges and thus provides for efficient grinding.



In this setup, $2\frac{1}{2}$ -inch long tractor valve springs made of 0.187-inch wire are fed to hopper from chute and placed in holders on

the feedwheel of the tandem special grinder. Alterations in feedwheel design can be made to accommodate the different workpieces.

WELDMENTS in Machine

High strength and unusual rigidity are features of welded steel base and column for heavy-duty boring and milling machine.

By B. J. BRUGGE
District Engineer, The Lincoln Electric Company,
Cleveland 17, Ohio

How good appearance can be combined with high strength and rigidity in heavy weldments is exemplified in the base and column for a heavy-duty precision boring and milling machine developed by the W. B. Knight Machinery Company of St. Louis. The equipment has many unusual design features and has been giving an excellent account of itself in terms of rigid and vibration-free service.

The illustration Fig. 1 of the two weldments positioned for bolting is a graphic indication of the clean, modern lines, incorporating curved contours in both column and base elements which are not usually found in welded plate construction. (The two sectional drawings in Figs. 3 and 4 — elevations through the center line of the two components—attest to the heavy ribbing and substantial plate thicknesses used throughout the two principal structures of the machine.)

A Fig. 2 shows the completely assembled machine, with spindle, table, cross slide and electrical control panel in position. A few general specifications will give an idea

of the size and capacity of the "Electromill." The table measures 36 x 48 inches (a second model has a smaller 24 x 36-inch table). The table cross travel is 30 inches; spindle head travel on the column, 16½ inches; spindle travel in the head, 8 inches; face of column to center of spindle, 12 inches; total throat, 35½ inches; height of throat, 18 inches; and maximum distance from table to spindle, 27½ inches. Workpieces weighing up to 2½ tons can be handled, with easy movement possible front-to-back or side-to-side under the spindle cutter.

Spindle speeds are infinitely variable in any range between 40 and 2,500 r.p.m. with a 25:1 ratio. Table feeds also are infinitely variable from 1 to 100 inches per minute. The table rapidly traverses in either direction at 100 inches per minute. All power controls are mounted on a movable panel with indicating lights and an emergency stop lever. Net weight of the machine is about 11 tons.

Drive motors are of the variable speed type—½ h.p. for the spindle feed, 1 h.p. for the table feed and,

Tool Construction

optionally, 3, 5, or 10 h.p. for the spindle. Connection is by V-belts, no gears being required. The spindle also incorporates a built-in type flywheel.

The two main weldments — column and base — weigh 4,200 and 6,500 pounds, respectively. Side plates for the most part are $\frac{5}{8}$ inch

thick, the top plate $1\frac{1}{4}$ inches and the bolting faces $1\frac{1}{2}$ inches. The five transverse vertical ribs in the base are of 1 inch plate, all with large cutouts in the center area to lighten weight and to eliminate the possibility of resonance or drumming effect. Flat ribs in the column are of $\frac{3}{4}$ inch plate, also cut out in

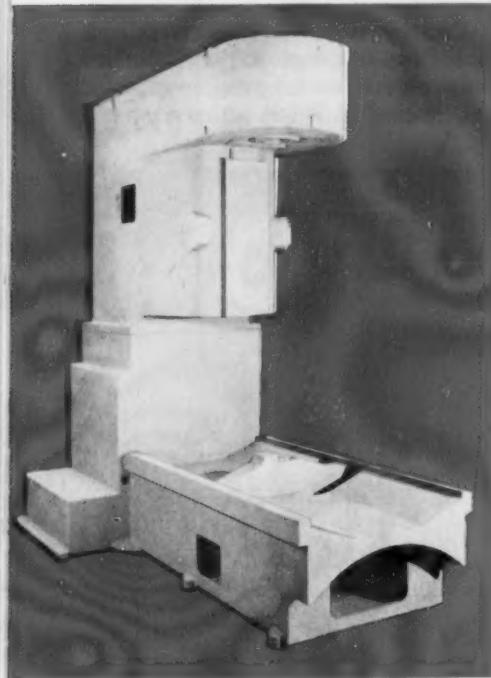


Fig. 1—This base and column for a precision boring, milling and drilling machine are of welded steel plate, combining good appearance with unusual rigidity. Note the locating bosses welded to side of column for positioning weldment during machining.

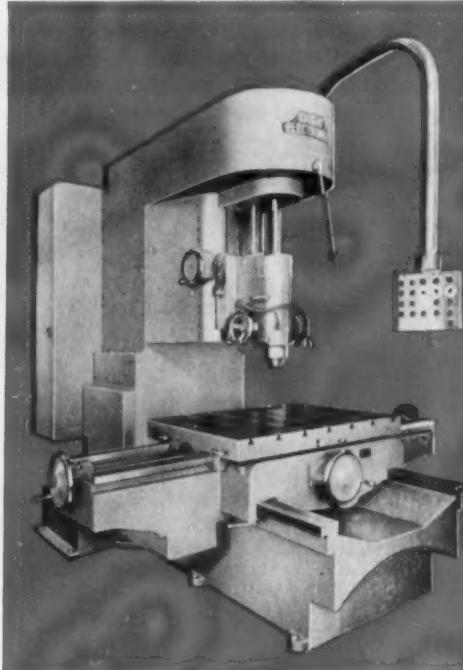


Fig. 2—Fully assembled "Electromill" with 36 x 48-inch table which can be traversed both crosswise and in and out. The machine weighs 11 tons and can handle workpieces weighing up to $2\frac{1}{2}$ tons. The control panel can be swung to any convenient position.

"Continuous fillet welds are specified on virtually all of the inside joints."

the center. The heavy slab on which the spindle carriage rides, on the forward face of the column, is $2\frac{1}{2}$ inches thick, $37\frac{1}{2}$ inches long, and is machined before welding to the main structure.

Bolting faces between the column and base are of $1\frac{1}{2}$ inch plate, also with large cut out areas in the center. They are roughly 36 inches square and are matched carefully for good outward appearance. A 3-inch offset is provided at the sides of the column member to allow drilling bolt holes through the bot-

tom plate for assembly to the base.

From the sectional drawings in Figs. 3 and 4, it will be noted that the welds at the corners, that is, between the vertical side plates and the top and bottom plates, provide virtually 100 per cent penetration. On the outside is a flat weld, the mating plates being beveled to develop about a 90-degree groove. On the inside is a two-pass fillet weld.

Continuous fillet welds are specified on virtually all the inside joints. Careful programming or sequencing of welds was necessary,

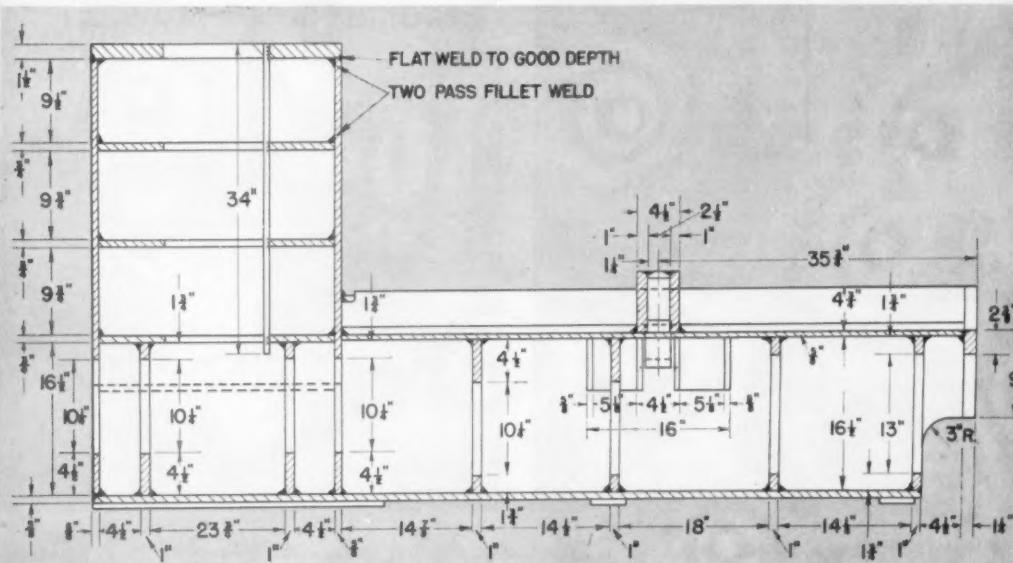


Fig. 3—Longitudinal cross-section through the center of the 6500-lb. welded steel base. Heavy plate ribs, with continuously welded

fillets, provide adequate rigidity for the machine base. The center cutouts in the ribs are approximately rectangular in shape.

"With welded construction, modifications in machine tool design are readily possible."

not only to provide access as the structures developed, but also to facilitate as much downhand welding as possible and to balance stresses which might lead to distortion. In the latter regard, the weldments were both stress relieved for two hours at 1,200 deg. F. and allowed to cool in the furnace.

Four 2-inch diameter bosses were attached to the sides of the column, as shown in Fig. 1, using three $\frac{1}{2}$ -inch tack welds equispaced around their circumference. These bosses are for positioning and holding

column firmly during machining operations and are burned off when machining is completed. Column and base were fabricated by Littleford Brothers, Cincinnati, from designs originated by the machine builder.

On heavy-duty special-purpose equipment of this variety, frequent modifications must be made to suit the setups of individual users. With welded construction, this is readily possible. A bracket, shelf or other attachment can be installed quickly and at a minimum of expense.

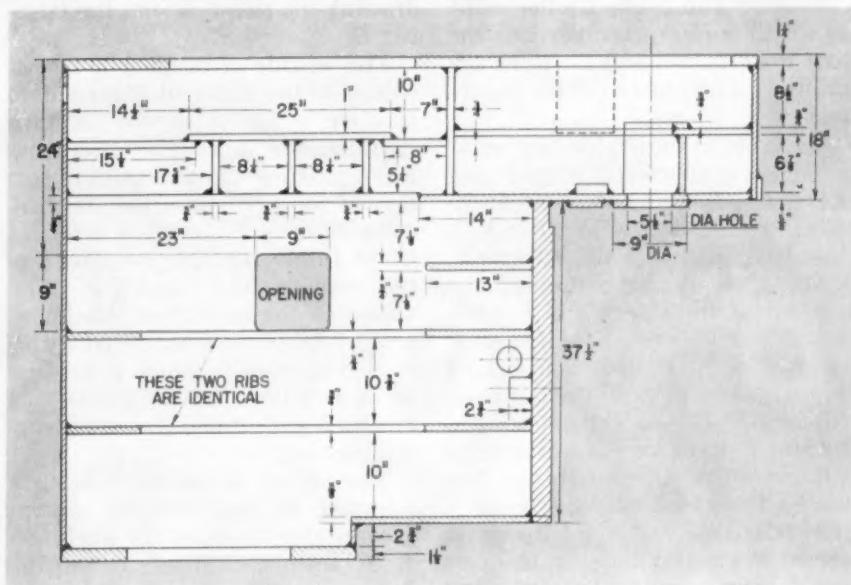


Fig. 4—Cross-section through center of column which is bolted to the base through the lower plate member. Vertical slide on

which the spindle carriage travels is a $2\frac{1}{2}$ -inch plate with a dovetail machined on the face before it is welded in position.

Anti-Friction Roller Bearing Steady Rest

Design minimizes friction and damage in turning long small diameter soft metal parts.

By W. M. HALLIDAY

Designed especially for use in turning long small diameter soft metal shafts, the lathe steady rest shown in the accompanying sketch was developed to minimize friction and marring of parts during cutting operations. The steady rest utilizes a standard anti-friction roller bearing which is interposed between the shaft to be turned and the three adjustable contact blocks of the steady rest.

Referring to the sketch, the workpiece *A* is supported in a mild steel sleeve, *B*, which is bored concentrically its full length to provide a close sliding fit over the workpiece. A slot, *C*, is machined through one sidewall of the sleeve and extends almost the full length of the part, terminating in a small hole drilled through the wall near the left-hand end of the sleeve. The purpose of the slot *C* is to impart a degree of springiness to the walls of the sleeve. The exterior of the latter is ground conical so as to fit closely within a tapered hole in the cast iron bushing *D*. The left-hand end of sleeve *B* is reduced in diameter for a short distance, this portion being externally threaded to accom-

modate a steel check nut, *E*. The adjoining side of bushing *D* is recessed substantially to receive the nut so as to limit the overall space occupied by the bearing. Tommy pin holes in the front side of the nut permit it to be adjusted for drawing the sleeve *B* into the bushing *D*.

The outside of bushing *D* is machined to two different diameters to produce a flange at the extreme right-hand end of the bushing. Press-fitted over the remaining portion of the bushing is the standard roller bearing *F*, which is arranged to fit firmly against the flange of the bushing. The bearing *F* is retained in the correct endwise position by means of a tempered spring steel snap ring, *G*, which is contained in a shallow annular groove that has been cut around the exterior of the bushing *D*.

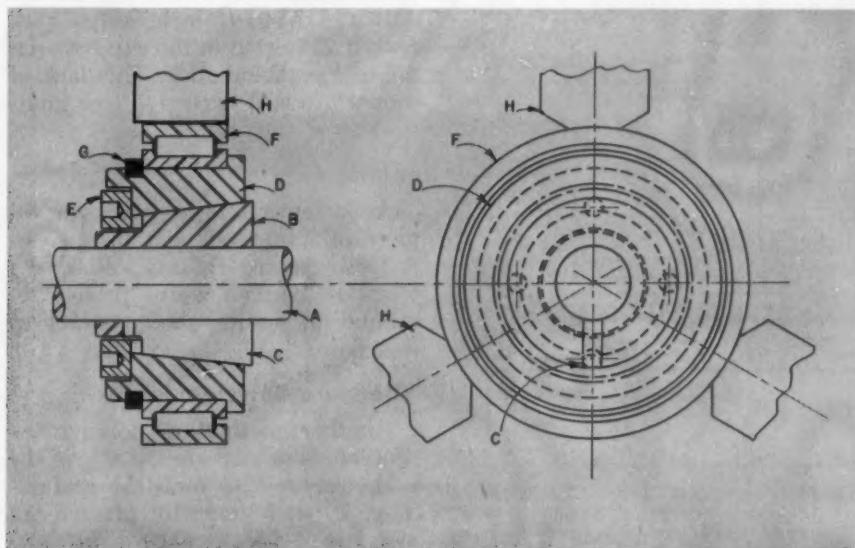
The sketch shows the bearing *F* adjusted in readiness for starting turning operations on the workpiece *A*. To install the steady rest on the workpiece, the nut *E* is released so that the sleeve *B* may be readily passed over the workpiece. When the sleeve is located in the approp-

"With this steady rest, it is possible to operate the workpiece at an unusually high speed . . ."

riate position on the workpiece, the nut *E* is tightened so as to draw the sleeve into the tapered bore of the bushing *D*. This action causes the split sidewalls of the sleeve to close in so that the sleeve firmly grips the workpiece. Thus, the sleeve *B* and bushing *D* revolve in unison with the rotating workpiece. Next, the three copper supporting blocks *H* of the steady rest are adjusted so as to bear evenly on the outer race ring of the bearing *F* as shown. The workpiece is thereby held concentrically and the outer race ring of the bearing *F* remains stationary while the other members of the steady

rest revolve freely with the workpiece being turned.

With this steady rest, it is possible to operate the workpiece at an unusually high speed with practically complete absence of friction, overheating and wear at the respective contact points of the steady rest. To handle workpieces of various diameters, several conical sleeves *B* can be made up, all sleeves having the same external size and taper for fitting interchangeably in the bushing *D*, but each sleeve having a different diameter bore so as to readily suit a particular workpiece diameter.



Sketch of anti-friction roller bearing steady rest for use in the turning of long small diameter soft metal shafts with a minimum of friction, heat, wear and marring.

Machining Stainless Steel

A case history showing how worn shop equipment can be improved to solve the problem of wide form tool vibration.

By G. J. STEVENS
Machining Engineer, Armco Steel Corporation

Problem:

A jobbing shop was having trouble machining $\frac{1}{4}$ -inch diameter Type 303 stainless steel. Short tool life and poor surface finish resulted

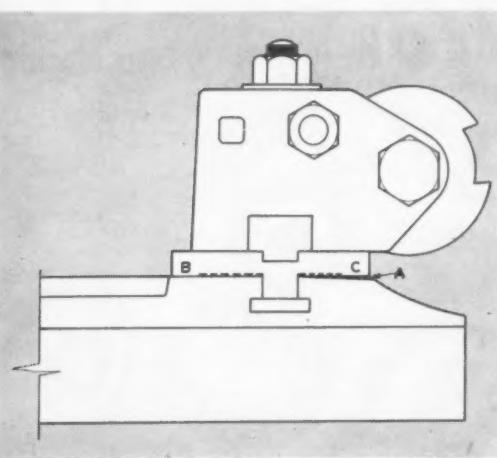
when operating a B & S automatic, using a wide form tool. Examination of the tool post revealed that the toolholder was not bearing on the cross slide, as shown at A in the drawing. A 0.015-inch feeler gage could be inserted in the gap between the tool post and slide. This lack of support caused excessive tool chatter and vibration.

Solution:

As an emergency repair, a small piece of shim stock was inserted at A for increased rigidity. When the toolslide became worn, it was reground to assure good contact at this point.

Alternate Solution:

Another method of solving the problem is to increase the size of the undercut on the toolslide and remove a small quantity of material (see relieved section between B and C). This provides a bearing surface and eliminates open space at A.



Drawing of form toolholder in which wear has occurred between the tool post and toolslide, as indicated at (A), thereby causing excessive tool chatter during machining operations.



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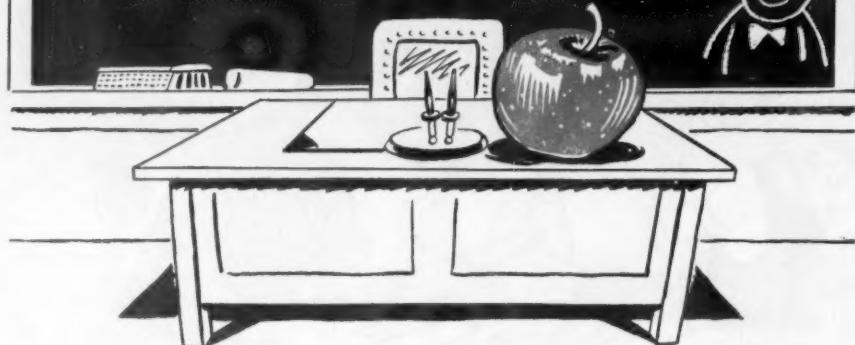
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THE SUPERVISOR AS A TEACHER



The roll of the supervisor both in job training and conference training is discussed.

By ALFRED M. COOPER
Contributing Editor

Among the essential qualifications of a good industrial supervisor the ability to teach must rate highly—not far behind the ability to delegate and the ability to co-operate. The shop or office supervisor must be continuously teaching on the job, if he is to keep his organization performing at peak efficiency. Or, if desired, either of these men may be detailed to full-time teaching, in connection with the plant's apprentice school, or for the purpose of training newly hired employees in the training division.

Again, any supervisor may be judged as to his ability to develop top-flight assistants, and this is, of course, wholly a teaching job. And finally, the supervisor may be utilized as a discussion leader, to train his subordinates in safety, public relations, or other subjects that may best be taught by conference method.

While it is true that the qualifications of a good teacher and of a good supervisor are much the same, it does not follow that supervisors automatically qualify as teachers. The foreman must learn how to

teach. It is to this immediate superior that the workman looks for instruction in new operations and processes.

JOB TEACHING

The general principles of industrial teaching, and the methods that get results, are the same whether the training is carried out in formal courses of study, as in apprenticeship training, or on-the-job, day-by-day. In either instance, *what is to be taught must be broken up into lessons small enough that the learner can readily assimilate the new ideas presented to him at a single session*. The skilled worker, with a wealth of trade knowledge for background, can absorb a lot of new ideas at a time. But even with this expert artisan it is possible to attempt to teach too much in one day. This effort to hurry instruction is the common fault of the untrained teacher.

Training fledgling supervisors is a continuous process, extending perhaps over a period of years, yet the job will be better done if supervisory technique is taught piece-meal, a lesson at a time. Oftentimes the fault of attempting to teach too much at one time stems from the supervisor's inability to recollect how hard it was for him to learn these same things, perhaps years earlier.

Thus, it is essential that the foreman who is to instruct his subordinates must first of all learn to *put himself in the learner's place*. This is the prerequisite for good teaching of any sort, and if practiced it will do away with attempting to teach too much at one time, and also will prevent the teacher from becoming im-

patient if the learner is slow in either grasping new ideas or acquiring new skills.

Once the supervisor learns to put himself in the learner's place, he will be constantly checking his own teaching technique, rather than being too critical of the learner's ability to absorb new information. This self-analysis of methods employed obviates teaching errors.

The industrial supervisor, shop or office, has recourse to four methods of instruction, and he may combine any number of these in teaching any lesson. He may tell the employee how to do something, thus utilizing lecture method. He may show how the thing is to be done, thus demonstrating the operation. He may utilize blueprints, sketches, blackboard developments, or motion pictures, thus using *illustration* as a teaching device. And he may even let the learner find out for



"... what is taught must be broken up into lessons small enough that the learner can readily assimilate the new ideas . . ."

"Checking the material to be taught will readily decide what combination of methods will get best results."

himself how to perform the operation by *experiment*.

A combination of the first two or three of these methods usually gets the best results. Experiment constitutes excellent instruction, and is the method by which we learn most of what we know about getting along with people. But it is very slow and costly in terms of time and material wasted.

Checking the material to be taught in any lesson will readily decide for the supervisor what combination of methods will get best results. Once this has been determined he must give thought to the teaching process itself. The four-step method for teaching trade subjects, developed by Charles R. Allen, is excellent for this purpose. The four teaching steps are:

Step 1—Preparation

In this initial teaching step the supervisor must *prepare the learner* for the new ideas. Usually this is done by questioning. If the supervisor is familiar with the employee's background he can readily find something already within the knowledge of the learner to which the new ideas may be tied.

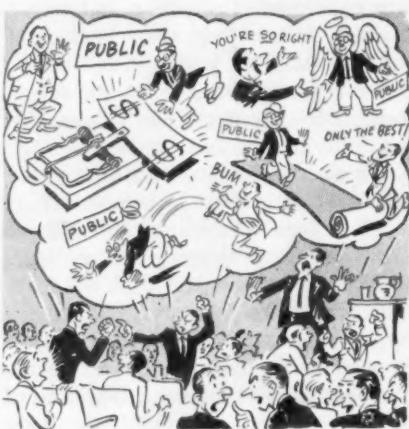
The questions asked in Step 1 should be so phrased that they cannot be answered by "yes" or "no." The instructor may thus assure himself that the employee is really thinking, and that his mind is running in the desired channel before beginning Step 2. Skimping the ini-

itial Step 1 accounts for many failures in trade teaching.

Step 2—Presentation

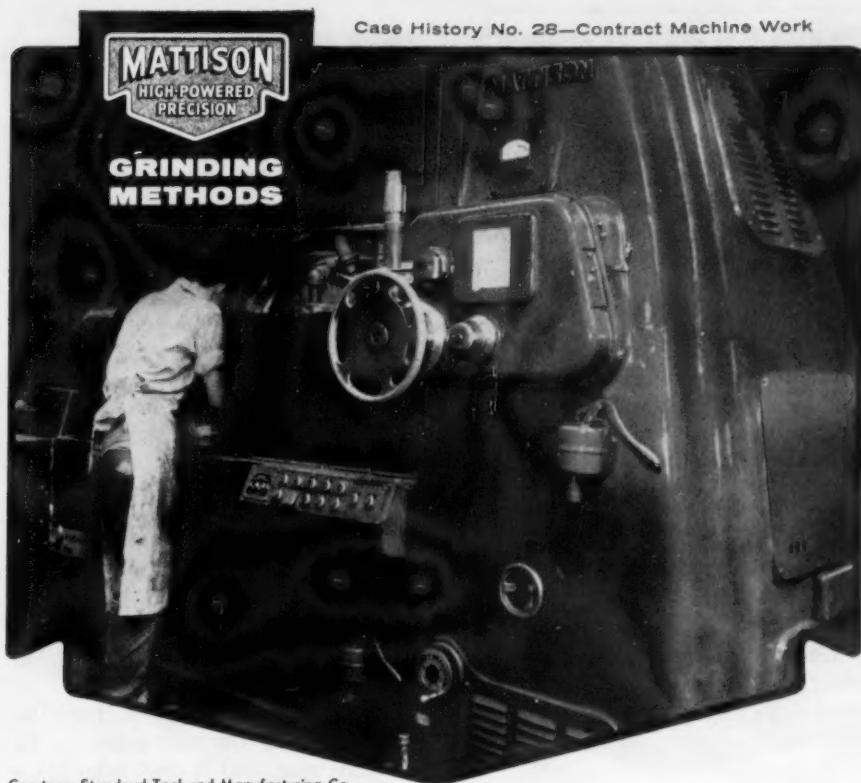
Here all the new ideas must be put over, by lecture, demonstration, illustration, or experiment, or by any combination of these methods. Thus, the supervisor, having prepared the learner's mind, now tells him how to carry out the operation. The supervisor's knowledge and manual skill are of real importance here.

Before this step can be properly completed the instructor must have predetermined just how much he can safely teach this particular learner in a single lesson. If the operation is complicated, or if the learner is not far advanced, it is always better to teach too little at a time, rather than



"... a group of 20 or 30 such employees could . . . develop a surprising number of excellent methods of dealing with the public."

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"In practice, the four steps of any lesson may be put over within the space of half an hour . . ."

too much. Here again, the supervisor must forever bear in mind how difficult it was for him to grasp these new ideas.

Step 3—Application

Up to now the instructor has been doing all the work, and therefore he has no way of knowing whether the learner actually can do the new job by himself. So after sufficient telling and showing and illustration, the teacher says, "All right, now let's see you do it."

If this application step is omitted or skimped the lesson will be but half taught. Until the learner proves, perhaps after considerable trial and error, that he really can perform the operation, Step 3 has not been completed. However, throughout this

practice period the instructor should assist the learner whenever he needs such help.

Quite often Step 3 requires more time to complete than the entire remainder of the lesson.

Step 4—Test

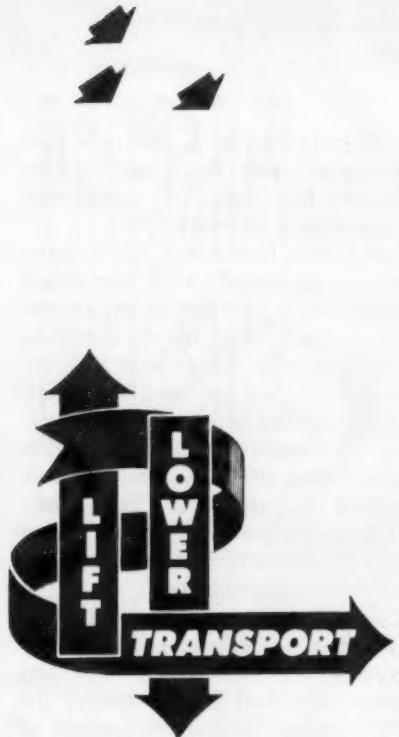
After the learner has demonstrated he can do a pretty good job on the new operation, with the occasional assistance of the teacher, he is ready to be tested. In this step the employee must prove to the satisfaction of the instructor that he has grasped the new ideas and can actually perform the operation just taught, and without assistance from anyone.

This examination step may be carried out by the instructor, or by someone else, and it may take place the same day as the other steps were taught, or a week or so later. This step in a sense is a test of the supervisor's ability to teach. Until the test step has been completed the lesson has not been taught.

In practice, the four steps of any lesson may be put over within the space of half an hour, or they may be spread over a period of days. An example of protracted teaching of a single lesson is found in training supervisory assistants. These junior executives receive a protracted series of on-the-job lessons in handling people that may well require weeks for the completion of Step 3 alone. It takes a lot of prac-



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"As a rule, supervisors make good job teachers, particularly after they have received some instruction . . ."

tice to learn such things as when and how to delegate authority.

Nevertheless, even here the second man must eventually demonstrate, on the job, and to the satisfaction of the supervisor, that he has mastered each of these lessons in supervision.

As a rule, supervisors make good job teachers, particularly after they have received some instruction in preparing and presenting lessons to subordinates. And so long as the need exists for upgrading older employees and breaking in new ones, the skill of the foreman or office supervisor as a teacher will form an important part of his total skills as an industrial supervisor.

CONFERENCE TRAINING

For trade teaching, and instruction in the skills and knowledge necessary for employee proficiency in shop or office jobs, the foregoing 4-step teaching method is unexcelled. For teaching such subjects as supervision, safety, and public relations, where much of the required knowledge already has been acquired by the employee *through experience on the job*, but needs to be correlated and organized if it is to be useful, the 4-step method does not provide best results. Here the use of conference method is indicated.

Conference instruction had its beginnings in industry, and has had its most significant applications therein. The method was first used, in 1914, to train supervisors who

were found reluctant to accept as fact statements made by lecturers who obviously had had little experience in supervising anyone.

But it was found that these same foremen enjoyed and benefitted greatly when permitted to discuss their mutual problems in handling subordinates. In this type of instruction the teacher reversed his traditional role and simply asked questions. The group members, after discussion that often became heated, supplied the answers. Thus, many excellent solutions to common supervisory problems were developed from the foremen themselves.

Conference training was next extended to public contact employees, the idea being that any worker who had been meeting the public regularly over a period of years must have acquired quite a bit of unorganized knowledge of public contacting. *And a group of 20 or 30 such employees could, in the course of a heated discussion, develop a surprising number of excellent methods of dealing with the public—all based on experience.*

Thereafter the same principle was applied to safety training. Employees in hazardous occupations were rightly assumed to have amassed much empirical knowledge of ways to avoid injuries. And in properly conducted discussions the knowledge of a score of such employees could be pooled, and workable methods of accident prevention agreed upon.

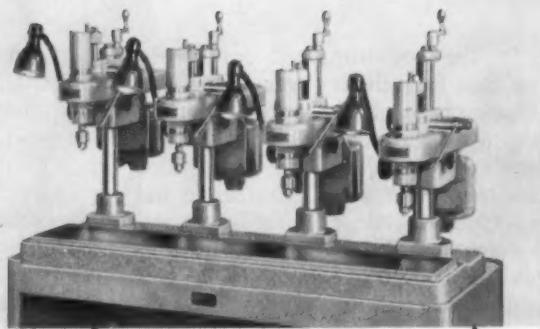
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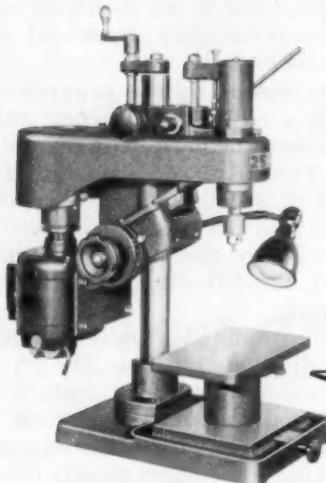
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For more data circle 295 on Reader Service Card

2467

"It is essential that the on-the-job relationship of supervisor and employee be satisfactory . . . to get results."

In the beginning all conference training in industry was carried on by members of the work's training division—skilled conference leaders who conducted training discussions in supervision, public relations, and safety. However, because of the supervisor's unique relationship with his subordinates it was felt that this conference training could better be carried on by these bossmen, if it was practicable to train them as competent discussion leaders. Also, of course, the cost of such training would be sharply reduced.

It was found that supervisors, when queried about this proposed added chore, were likely to shy away from tackling anything so strange. But if the supervisors of a division were called together, told what they were to do, and then were permitted

to participate in a conference identical with that they were later to lead with their own subordinates, they accepted this added responsibility as a matter of course. And they did a splendid job at training these subordinates.

In one plant I utilized 150 supervisors as conference leaders and only one of these failed to develop into an excellent leader of discussion. Also, participation in this activity was instrumental in developing these men into better supervisors. It is essential that the on-the-job relationship of supervisor and employee be satisfactory if such conferences as these are to get results. So some supervisors had to improve their supervision before they could lead resultful conferences.

Participation by the supervisor in such a training program calls for but three or four hours monthly of his time. As an example of the method of installation of a comprehensive program in safety or public relations by rehearsed-conference method, the following procedure is suggested:

1. The training is usually installed in one division at a time. The problems in safety or public contacting are likely to be similar throughout a division, and the supervisors selected to lead the conferences usually number about eight to make a nice group for the rehearsal meetings.

When these supervisors have been assembled, the administrator of the training program explains the new

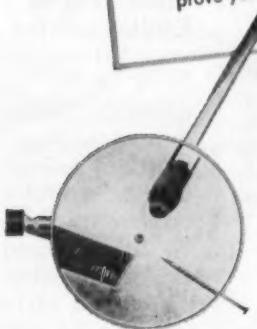


"The training program that is adopted must, of course, get demonstrable results."

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**"The leader must conduct
an interesting conference . . ."**

program in a few words. Then he at once opens the discussion, leading the identical conference these supervisors will later lead with their own subordinates.

The supervisors here act as a con-

ference group, but also have been asked to note how the leader conducts the meeting, so they can conduct a similar one later on. Thus, their particular role at this meeting is the dual one of participant and observer.

2. The leader of this first rehearsal meeting has prepared carefully for this session. He must lead an extremely interesting conference and do this without apparently exerting much individual effort.

Then he has earlier prepared certain mimeographed materials for issue to these supervisors. There must be a detailed conference plan for each man, in which the procedure of the meeting he is to conduct is carefully outlined. Once he has watched the administrator lead this meeting he will thoroughly understand this plan.

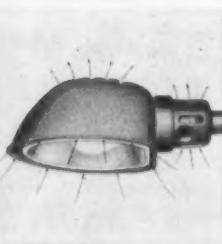
Also, I have always furnished each supervisor with a mimeographed or printed brochure which epitomizes successful methods of con-

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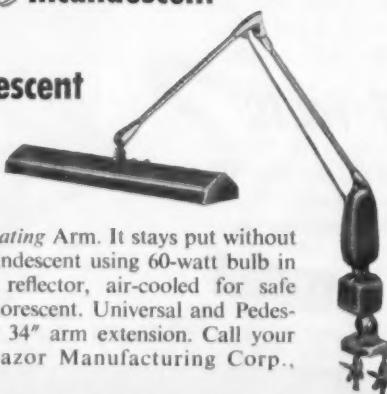
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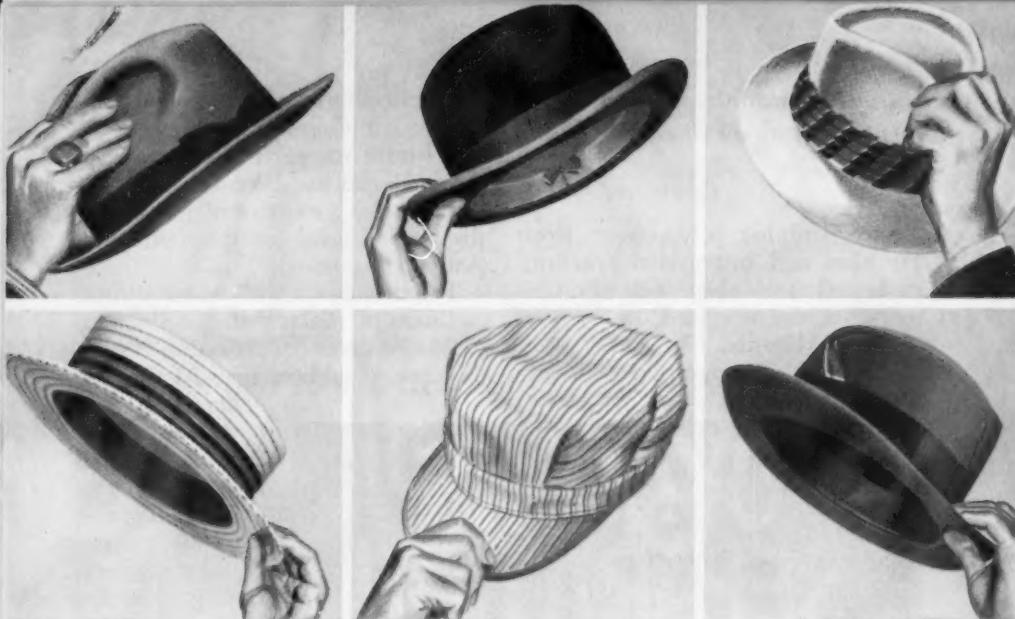
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"... the administrator should be present as an observer . . ."

ducting training conferences. Both the plan and instruction brochure are issued at the close of this first rehearsal conference, and the purpose of each explained to the members.

Finally, a mimeographed schedule

of employee meetings is issued, giving the conference room, date, time, and leader for each meeting. After this material has been fully considered by the members of the group, the leader asks for questions and general discussion.

The discussion will center around methods of making the initial employee conference successful. If such discussion had been permitted at the

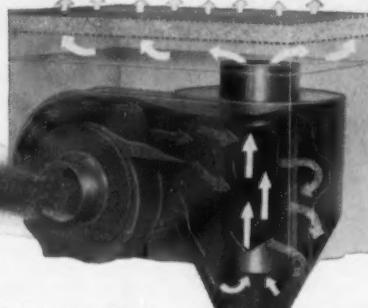
opening of this rehearsal meeting it would have taken the form of efforts to sidestep the entire program. But by now the supervisors are intrigued and they are ready to try their hand at this new method of training.

3. During the first round of employee meetings the administrator or an assistant should be present as an observer — a *silent* observer — at as many of the conferences as possible. The supervisors should have been told in advance that their conferences will be observed.

The first round of employee meetings may

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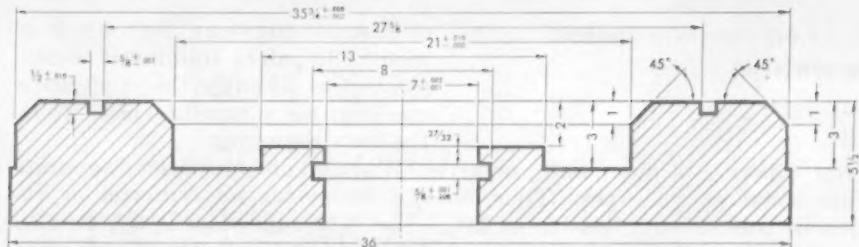
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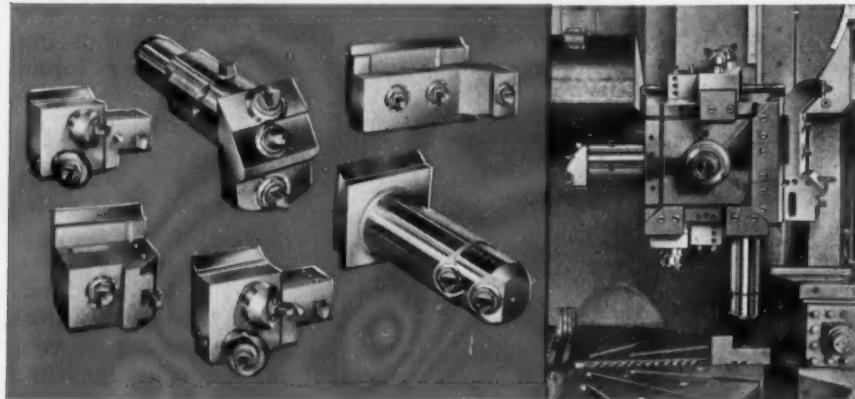
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2720 West Fourteen Mile Rd., Royal Oak, Michigan

For more data circle 300 on Reader Service Card

January, 1957

modern machine shop

143

**"... an observer makes
no criticism . . ."**

cover a period of one month, or in some instances, two weeks. Thus, it may be considered advisable in instances to schedule a preliminary, intensive series of, say, eight conferences, fortnightly, after which the

employees convene but once a month. In safety training it is customary to schedule the conference meetings on a monthly basis from the very beginning.

When an observer attends a meeting he makes no criticism at its close. The supervisor is not then in a frame of mind to accept criticism. But the next day the observer sends him a critical report, praising him for good performance as a conference leader, and suggesting methods of improving future conferences. Studying this report is helpful to the supervisor in the period before the next round of meetings.

4. The second-round rehearsal meeting is conducted much like the first one, except that more time is devoted at the conclusion of the demonstrated conference to discussion of conference training technique.

These rehearsal sessions usually run two hours. The employee conferences usually require an hour



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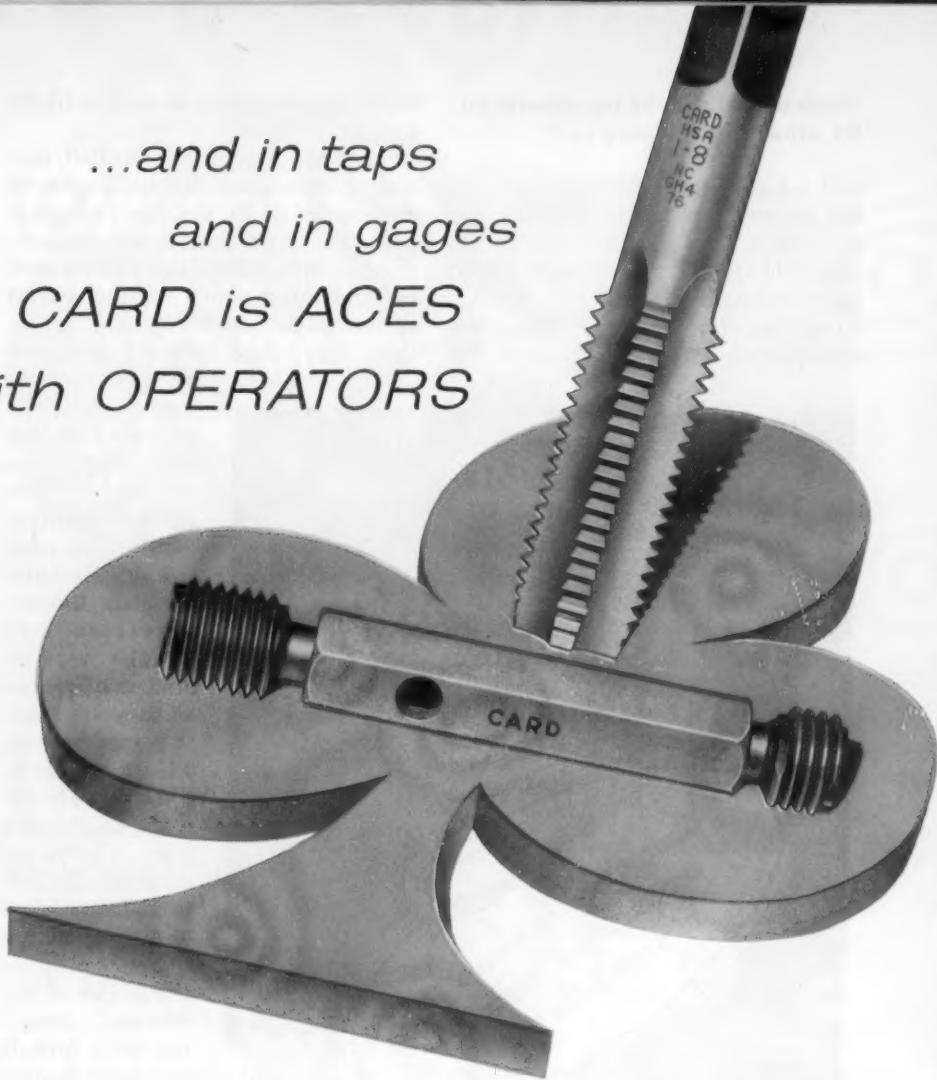


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For more data circle 302 on Reader Service Card

"Questions should be answered by other supervisors . . ."

and a half. Each succeeding rehearsal meeting has as its nucleus the discussion by the supervisors of the identical questions they will put to their subordinates during the ensuing round of meetings. Thus, the supervisors are familiar with the

trend the discussion of each is likely to take.

Then the brochure is studied, and assignments given for discussion of sections of it at the next meeting. And plenty of time is allocated to discussion of difficulties experienced by the supervisors in the round of meetings just completed. Questions thus raised by the supervisors should, whenever possible, be answered by other supervisors, rather than by the administrator. Through these various methods the supervisors are taught to conduct conferences as they are leading conferences. Their remarkable improvement in this art will pleasantly surprise the administrator.

5. As the course continues the leader of the rehearsal meeting will find it necessary only to prepare a good set of discussion questions to be incorporated in each conference plan, and to continue the instruction in conference leadership. Much of

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2 holders, 13 counterbores
 $\frac{1}{16}$ " to $1\frac{1}{2}$ " dia., 3 countersinks,
23 pilots.

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3

4 holders, 21 counterbores
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A TWIST OF THE WRIST!
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56-15
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January, 1957

modern machine shop

147

Continental
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"... discussion questions must be thought-provoking . . ."

the success of this type of training program depends on those discussion questions. They must be intensely thought-provoking, and so worded that they apply with equal force to situations in the various depart-

ments and sections of the division.

It is not necessary to visit employee conferences but occasionally, since only a spot-check is required. In other words, after a few conferences the program is established in that division and will continue without much supervision, provided the rehearsal meetings are properly conducted. These meetings serve to give the supervisors the necessary inspiration to conduct successful meetings in the round to follow.

This, then, is the time to expand the program by beginning rehearsal meetings with the supervisors of another division. The success of the program in the initial division is by now well known throughout the organization. This fact will make the administrator's work much easier in the second and succeeding divisions.

Within the space of a few months the administrator, with the aid of one or two assistants, is carrying on a training program utilizing

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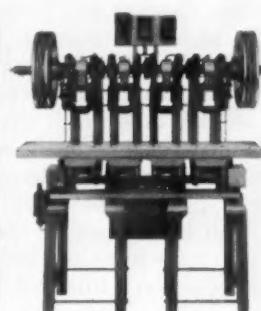
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For more data circle 306 on Reader Service Card

January, 1957

modern machine shop 149

"Supervisors make good conference leaders . . ."

ing the services of more than 100 supervisors as instructors. The training cost is very small, and the results are at least as good as though a dozen or more instructors had been added to the training division's payroll.

Supervisors make good conference leaders, and they prefer to train their own subordinates. And it has been repeatedly demonstrated that the supervisor is in the best position of anyone to see to it that improved methods (of preventing accidents or contacting irate customers) developed by the employees in conference are put into effect on the job.

When the meetings occur but once monthly (and this is often enough

for carry-over once the program has been established) participation in the program constitutes no burden on the supervisor. Also, as has been indicated, leading these conferences definitely tends to improve the relationship of the supervisor with his subordinates. The improvement here is often commented on by the division head.

The training program that is adopted must, of course, get demonstrable results. But any training program should be scrapped if it cannot prove its worth in dollars and cents. This one will continue to be successful if only the administrator prepares sure-fire discussion questions for use by the supervisors in their conferences, and then further makes every effort to improve the conference leadership technique of these particular supervisors.



Machine Performs 20 Operations on Crankcases

A large electrical manufacturer is now using the machine illustrated—an eight-station rotary indexing model made by Ex-Cell-O Corporation of Detroit—performs more than 20 operations on air conditioner compressor crankcases. Operations include rough boring, counterboring, facing, spot facing, drilling, chamfering, back-chamfering and tapping. The machining cycle is entirely automatic, including clamping and unclamping. Made of die-cast aluminum with cast-iron cylinder liners, the crankcases are of one, two and three cylinders.

For more data circle 78 on Reader Service Card



This eight-station rotary indexing machine is designed to perform more than 20 operations on air conditioner compressor crankcases.

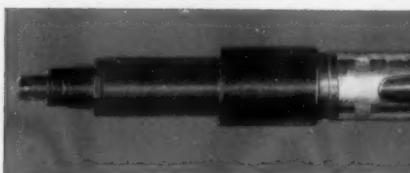
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of Uni-Tork on your
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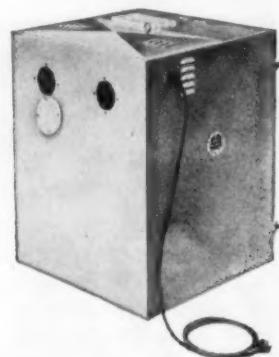
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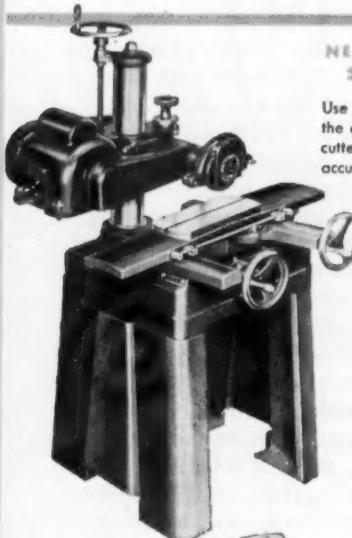
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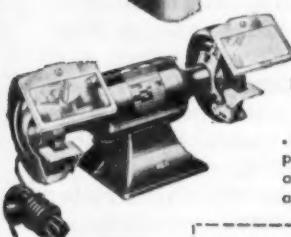
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For more data circle 309 on Reader Service Card

Machining Cast Armor With Insert Tooling

Heavy-duty indexable insert tooling is used to turn, face and bore 38 1/2-inch diameter pieces.

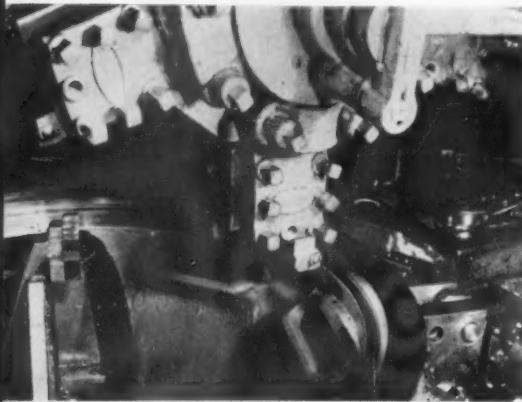
The turning, facing and boring of 38 1/2-inch diameter pieces of cast armor of the type shown in the accompanying illustration are readily accomplished with heavy-duty Kendex indexable insert tooling. These armor parts have a Brinell hardness of 280 to 300 except in some chilled spots that are still harder. Furthermore the bottom of the bore requires severe interrupted cutting.

With the heavy-duty Kendex indexable insert tooling, two castings are rough machined per cutting edge and six pieces per cutting edge are finish machined. These parts

are machined on two 54-inch Bullard Cutmasters. Depth of roughing cut is 1/4 to 7/16 inch with feed of 0.015 inch at 270 s.f.p.m.

For roughing the face and shoulder, a Style KRB-24 tool with rectangular insert is used. Since this insert has four cutting edges, eight pieces are machined before discarding. The outside diameter of the part is rough turned with a Style KFL-24 tool and boring is done with a Style KFR-24 tool. Parallelogram inserts for these tools are interchangeable with these tools, thus permitting the use of four cutting edges, each of which are good for machining two pieces. A total of eight pieces is machined with each of these inserts also, four on each tool.

Finishing operations are done with parallelogram inserts and a Style KAR-24 tool. Since less strength of cutting material is required for finishing, the harder Grade K4H inserts are used instead of K2S which was used for roughing cuts. Six pieces are finish machined per cutting edge for a total of 12 pieces with this tool and 24 pieces with each of the other finishing tools. Depth of the finishing cut is 1/32 inch with feed of 0.015 inch at 250 surface feet per minute.



Machining cast armor part with Kendex tooling having "throw-away" button inserts.

Abrasive Cutting

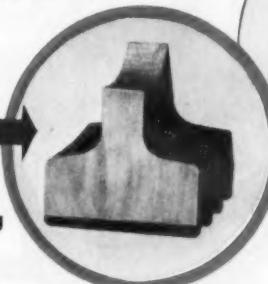
*the best way to cut many materials
the only way to cut some*

Campbell Cut-Off Machines

**WHAT KIND OF A CUT DOES
YOUR JOB REQUIRE?**

THIS

Clean, smooth edges
that require
no further finishing



or THIS

Rough, serrated edges
that must be machined
if smooth finish is required

• The smooth cut—made on a CAMPBELL Oscillating Wet Abrasive Cut-Off Machine and the just-right ALLISON Abrasive Wheel for the job—saves a grinding operation at a Midwest gear plant.

Another combination of CAMPBELL Cut-Off Machine and ALLISON Wheel cuts stainless steel tube twice as fast as by other methods for a large aircraft manufacturer.

Can you cut tough K Monel, $4\frac{1}{4}$ " dia., in two minutes per cut by present methods? Whatever your problem, our abrasive cutting specialists can improve your cutting operation and save you money.

OSCILLATION makes these big cuts with speed and economy

• The cross section of gear teeth (shown left above) is cut smooth, fine-finished and ready for metallurgical study.

It results from the wet cut of an Oscillating CAMPBELL Abrasive Cut-Off Machine with abundant coolant applied just where it does the most good. The Oscillation of the ALLISON Abrasive Wheel, the right one for the job, handles big cuts like this with speed and economy.

If your cutting involves alloy or high carbon steel, this CAMPBELL-ALLISON combination just can't be beat.

ACCO



**Campbell Machine Division
AMERICAN CHAIN & CABLE**

931 Connecticut Avenue, Bridgeport 2, Connecticut

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*it takes
top
equipment
to cut
the best
gears*

**BARBER-
COLMAN
offers**



Superior Hob Accuracy

As a result of long experience and skill in hob manufacture, Barber-Colman offers a new concept of ultra-precision in hob tolerances. An example is a 48 DP Class AA hob, ground to total allowable lead variation of .00015" tooth-to-tooth, .00015" in any one axial pitch, and .0003" in three axial pitches. Tolerances such as these are only practical where machine and hob sharpening have equally close tolerances. We suggest you contact our engineers for recommendations when you have jobs requiring hobs of this accuracy.

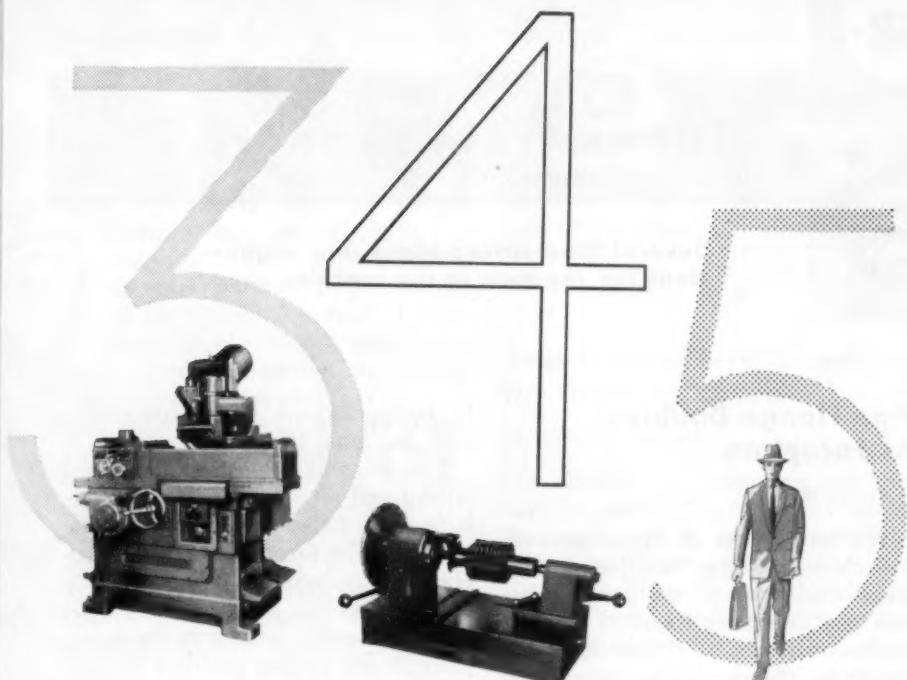
For production hobbing, Barber-Colman makes Class A, Class B and Class C hobs. Classes A and B are ground on the form and are recommended for accurate finishing and semi-finishing. Class C Accurate Unground hobs are used primarily on preshaved gears. All hobs are well within the standard tolerances for their particular class and pitch.

Automated Gear Production

For high speed, mass-production gear problems, Barber-Colman engineers have developed fully automatic hobbing machines, including magazine or hopper-feed loading, fully automatic cycle and automatic hob shifting.

For maximum production of specific parts, machines are designed with special purpose tooling, loading, gaging and handling to suit the requirements for accuracy and finish. Such machines may also include inspection, rejection, and size-gaging as part of the automatic cycle.

General purpose hobbing machines are available for hobbing parts up to 16" diameter, from 3½ DP to the finest pitches. A variety of special tooling can be furnished—hydraulic, pneumatic, electric—to give maximum accuracy and production efficiency for the particular problem.



Controlled Hob Sharpening

The inherent accuracy in Barber-Colman hobs and hobbing machines may be upset if all factors are not in adjustment. A common cause for loss of accuracy is error in resharpening hobs. To provide positive sharpening control on a production basis, and to insure maximum accuracy in sharpening, Barber-Colman engineers have developed a series of automatic sharpening machines. With these machines the sharpening operation becomes simple, fast and convenient, and original tool accuracy is easy to maintain.

Hob Sharpening Inspection

The Barber-Colman Hob Sharpening Checker is a precision instrument for measuring the accuracy of face sharpening on straight and helical fluted hobs. The precision found in Barber-Colman hobs is inherent and the only place it can be lost is in the sharpening operation. Reasonable in cost, this checker furnishes a convenient method for checking the sharpening accuracy.

Gear Cutting Service

Barber-Colman hobbing engineers, backed by years of experience in the field, and special skills acquired in production hobbing of gears, are available without cost to analyze and make recommendations on gear problems. This service will help to maintain peak efficiency in your gear cutting operations. Send us inquiries about accuracy, tooling, production and special tooth-forms.

BARBER-COLMAN COMPANY

641 ROCK STREET • ROCKFORD, ILLINOIS

Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines



For more data circle 312 on Reader Service Card

January, 1957

modern machine shop

157

ideas from readers

Several time-saving ideas and suggestions for the man in the machine shop.

Pipe Flange Doubles As Faceplate

By ROGER ISETTS

We had a few short lengths of 4-inch iron pipe that had to be bored and grooved. While the job was not one that required a high degree of accuracy, it was still necessary for the machining operations

to be performed fairly concentric with the pipe threads.

The job was given to a clever old lathe hand who took a standard 4-inch pipe flange and bolted it directly to the faceplate of the lathe. He then screwed the pipe to be machined into the flange with a pipe wrench, thereby setting up the workpiece in the proper position for machining, as shown in the accompanying sketch.

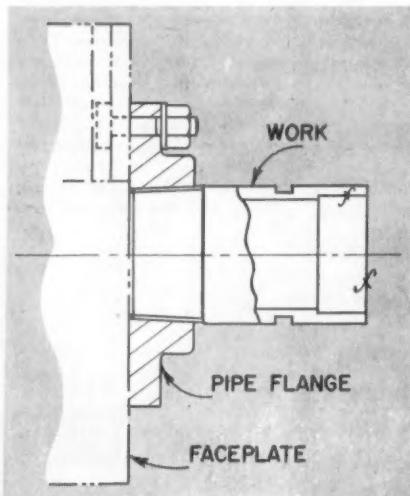
★ ★ ★

Dial Indicator Gaging Fixture Checks Inside Tapers

By ALEX S. ARNOTT

To measure a taper of 2 degrees and 25 minutes on the workpiece marked X in the accompanying sketch, a fixture equipped with a standard dial indicator, I, as shown, can be used to make an accurate inspection check of any variation on the tolerances allowed for this dimension.

The base, J, of the fixture is made after the style of a toolroom



Sketch shows pipe flange used as faceplate.

surface plate with a mounting block, A, which is bored for the plunger, B, located at one end of the fixture and the dial indicator block, C, located at the opposite end. This block holds the dial indicator, I, which is mounted with the horizontal center line of the dial at an angle of 2 degrees 25 minutes, or mounted parallel to the center line of the swinging arm, K, fastened on the pivot, D. The gaging end of the arm is rounded to provide the most advantage in making contact with the workpiece, as shown at H. The light spring, M, maintained in place by the pins, L, holds the arm against the plunger of the dial.

In operation, the workpiece is mounted on the plunger, F, with the face of the piece resting against the shoulder, G. The plunger is moved toward the gaging arm, the gaging surface, H, entering the opening of

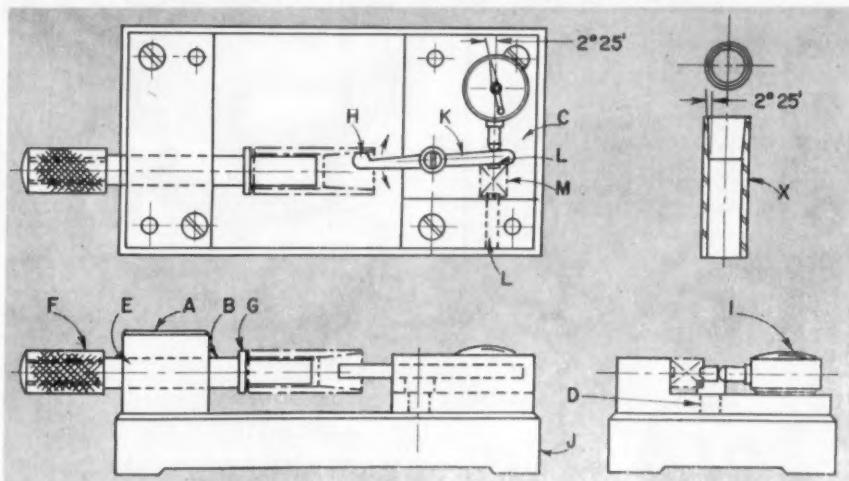
the taper. The operator may advance or retard the plunger along the length of the inside taper and the plunger may also be turned with a circular motion so that the diameter may be gaged at any point between the top and the bottom of the taper.

★ ★ ★

Anti-Friction Straightedge for Drafting Board

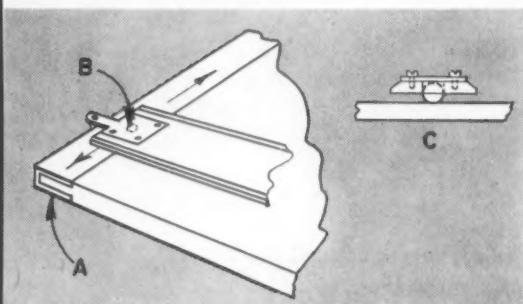
By FREDERICK BARKER

A simple but effective method for producing an anti-friction straightedge for a drafting board is shown in the accompanying sketch. To make the straightedge, a piece of metal edging is first fastened to each end of the drafting board, as shown at A. The thickness of the straightedge to be used is next



Sketch showing dial indicator gaging fixture for use in checking inside tapers.

ideas from readers . . .



Sketch showing method for making an anti-friction straightedge for the drafting board

measured and two ball bearings approximately 1/64 inch larger than this thickness are inserted in two holes drilled through the ends of the

straightedge to accommodate one ball at each end, as shown at *B*. Each ball is retained in its hole by means of a spring clamp plate, as shown at *C*.

In use, the straightedge rides freely up and down on the metal edging of the drafting board by virtue of its ball bearings and is retained in position on the board by means of the spring clamps at the ends of the straightedge.

★ ★ ★

Reverse-Operating Collet

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P124	12" x 12" x 24"	\$715.00	\$822.25
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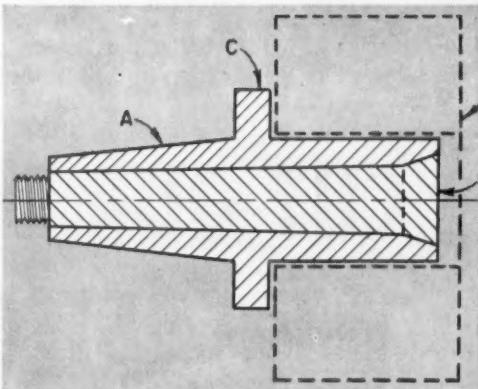
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ideas from readers . . .

shown herewith, which holds work-pieces by gripping them internally. Referring to the sketch, the device, which is actually a reverse-operating collet, consists of the member A, one end of which has a standard No.



Cross-sectional sketch of reverse-operating collet, designed to grip parts internally.

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3 Morse taper corresponding to the lathe spindle nose, while the other end is turned and ground cylindrically to a diameter that closely corresponds to the inside diameter of the workpiece B. The middle section of the member A has an integral stop collar, C.

The entire device is axially bored out to a diameter of $\frac{5}{8}$ inch, with one end of the bore provided with a 15-degree taper. This same end of the collet is slit axially in several places to allow for radial expansion. After completion, the device is case hardened to minimize wear. A close-

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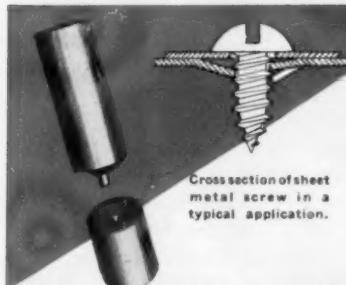
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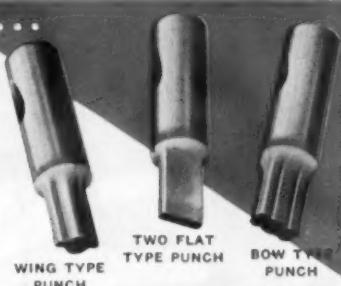
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R-B Clinch Nut Tooling permits you to insert and clinch one or more nuts with each stroke of the press—no extra clinching or welding is necessary. Also, the same die can pierce, form or blank your product. R-B furnishes standardized punches, die buttons, hoppers and flexible feed chutes for any size or shape Clinch Nuts.



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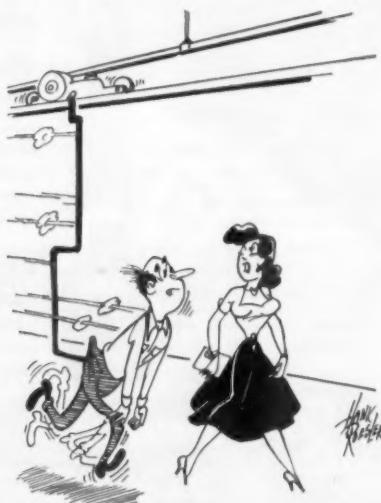
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164 modern machine shop

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fitting steel rod, *D*, is inserted in the bore of the collet, one end of the rod being threaded to match the female threads in the collet closing device.

To use, the reverse-operating collet is substituted for the lathe chuck after the workpiece has been bored to an exact inside diameter and face-turned at a right angle to the bore axis. The device functions about the same as a standard collet except that the collet segments are not contracted, but rather expanded when the collet closing device is tightened; thus, the workpiece is held internally. For releasing the workpiece, the collet-actuating device is loosened, permitting the workpiece to be easily slipped off the collet.



"For Pete's sake, stop following me!"

January, 1957

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PISTON
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BUT...

SIDNEY LATHES
INCREASED PRODUCTION 25%
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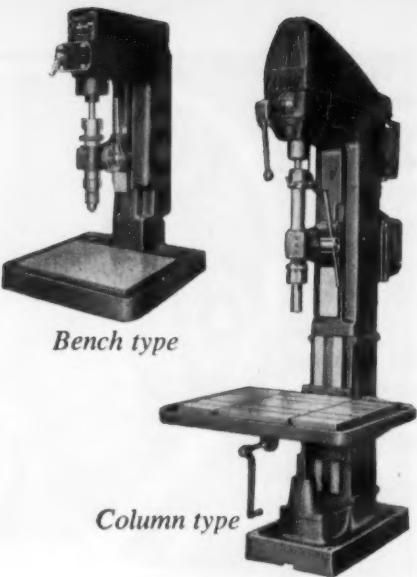
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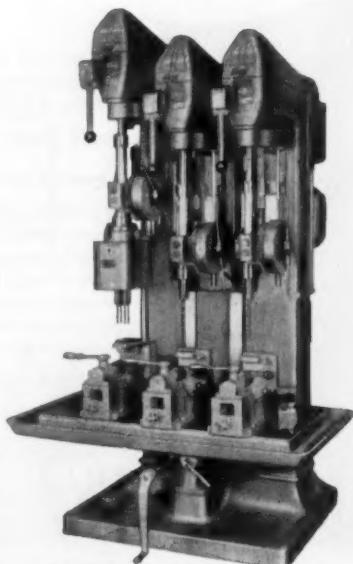
Avey has the right one

Column or bench type, with wide range of swing, 1 to 8 spindles.

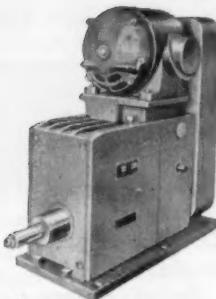
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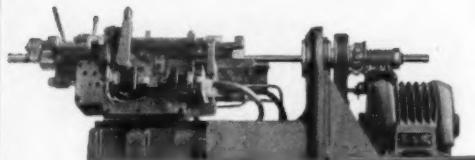
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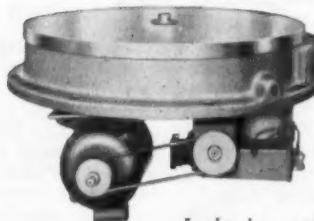


drilling, tapping, production machines

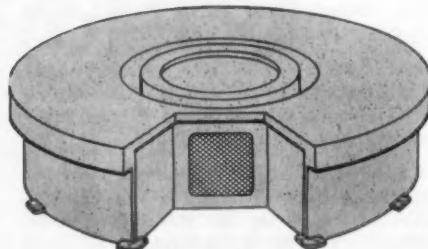
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Penn Scientific Products Co., 1000 Old York Rd., Abington, Pa. Precision lapping and fine micro-finishing with diamond abrasives.

51. Machine Shop Specialties

Podlin Tool Co., 11917 Franklin Ave., Franklin Park, Ill. Lead hammers, clamp support blocks, strap clamps and stud sets.

52. Mechanical Comparator

Pratt and Whitney Co., Inc., 25 Charter Oak Blvd., West Hartford 1, Conn. Sigmatic Mechanical Comparator for close tolerance inspection.

53. Die Sets

Producto Machine Co., 912 Housatonic Ave., Bridgeport 1, Conn. Die sets and die accessories.

54. Turret Lathe

Rivett Lathe and Grinder, Inc., Dept. MMR-10, Brighton 35, Boston, Mass. Model 918ST Hand Turret Lathe.

55. Assembly Machine

Omer E. Robbins Co., 24800 Plymouth Rd., Detroit 39, Mich. "Assemblomatic" special assembly machines for assembly, milling, grinding, boring and drilling.

56. Drill Press

Rockwell Manufacturing Co., Delta Power Tool Division, 465 Lexington Ave., Pittsburgh 8, Pa. Delta 20 Inch Drill Press which is engineered for production tooling.

57. Floating Holder

Seibert and Sons, Inc., Chenoa, Ill. Floating Tap and Reamer Holder with fast change presetting collets.

58. Electric Furnaces

The Sentry Co., Foxboro, Mass. Model "Y" Electric Furnaces and Sentry Diamond Block — a method of atmospheric control for hardening high-speed steel.

59. Center Measuring Device

Sorensen Center-Mike's, Inc., 264 Kossuth St., Bridgeport 8, Conn. Booster-Bar increases measuring range of Center-Mike.

60. Vertical Milling Machine

South Bend Lathe Works, South Bend 22, Ind. Vertical Milling Machine for toolroom, production and die shops.

61. Lapping Machines

Spitfire Tool Co., 2930 North Pulaski Rd., Chicago 41, Ill. Lapping machines that produce super-fine, micro-inch surfaced finishes.

62. Snagging Grinders

Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio. Infinitely variable speed snagging grinders.

63. Dial Snap Gages

Standard Gage Co., Inc., 134 Parker Ave., Poughkeepsie, N. Y. "Paralloc" locking mechanism for maintaining parallelism of anvil faces.

64. Head Set and Cap Screws

Standard Pressed Steel Co., Jenkintown, Pa. Complete line of Unbrako products, including socket head set and cap screws, stripper bolts, socket screw keys, dowel pins and so on.

65. Band Saw Blades

The L. S. Starrett Co., Athol, Mass. Metal regular, skip-tooth and spring temper cutting band saw blades available in all popular widths.

66. Cutting Saw

Stone Machinery Co., Inc., 131 Fayette St., Manlius, N. Y. Model SS-20LR Traverse Type Cutting Saw.

67. Shaft Machines

Stow Manufacturing Co., Binghamton, N. Y. $\frac{1}{4}$ h.p. multi or single speed flexible shaft machines.

68. Torque Tester

P. A. Sturtevant Co., Addison, Ill. Precision Optical Torque Tester.

69. Greases

Sun Oil Co., Philadelphia 3, Pa. Sun Prestige 40 Series is a new line of premium greases.

70. Drilling Machines

Taylor Dynamometer and Machine Co., 6411 River Pkwy., Milwaukee 13, Wis. Hi-Eff Sensitive Precision Drilling Machines.

71. Dust Collectors

Torit Manufacturing Co., Dept. 703, 296 Walnut St., St. Paul 2, Minn. Cabinet Cloth Filters and Cyclone Separator Type Dust Collectors.

72. Seal Fitting

Tru-Seal Division, Flick-Reedy Corp., 2024 North Hawthorne Ave., Melrose Park, Ill. Tru-Seal — a pipe thread seal fitting which assures perfect sealing of pipe thread elements.

73. Adaptors

Weddell Tools, Inc., Rochester, N. Y. Tri-Bit Adaptors for standard triangular inserts.

74. Chamfering Tools

Wesson Co., 1220 Woodward Heights Blvd., Ferndale, Mich. 30 and 45 degree chamfering tools.

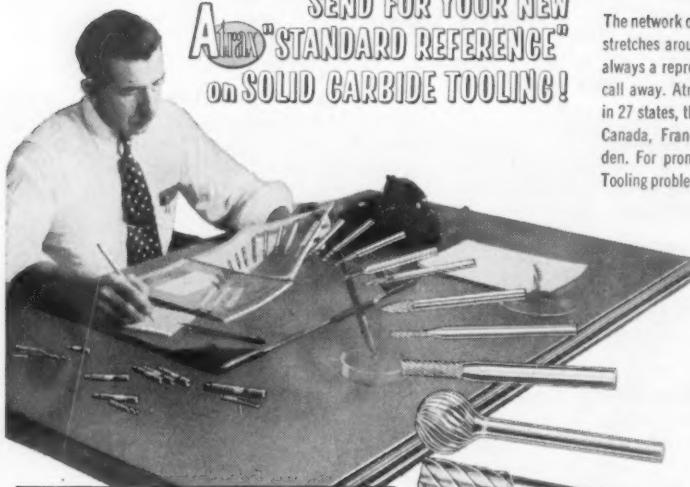
75. Dermatitis

West Disinfecting Co., Long Island City 1, N. Y. "The Control of Dermatitis in Industry."

76. Multiple Drill Head

Wisconsin Drill Head Co., 4983 North 124th St., Butler, Wis. "Quick Change" Adjustable Multiple Drill Head is entirely gear driven. Standard models available with 2 to 8 spindles.

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This is our famous booklet *The Art of Blanchard Surface Grinding* — brought up-to-date with a third edition. It contains complete descriptions of our silicate, resinoid and vitrified bonded wheels. It also describes a number of jobs and shows you how to select the correct wheel for each job. Every Blanchard operator should have a copy handy — send for yours today.

Blanchard wheels are guaranteed for uniformity of grade. They're best for Blanchard grinders, best for every job. They give you maximum production, utmost economy . . . whether the work is tough as copper or fragile as glass, whether it requires heavy roughing cuts or precision grinding within .000010" of absolute flatness and surface finish of 1 micro-inch.

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January, 1957

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news
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industry

news of the industry

New plants and expansions . . . meetings . . . awards . . . obituaries . . . new appointments

SECOND NATIONAL METAL FINISHING SHOW

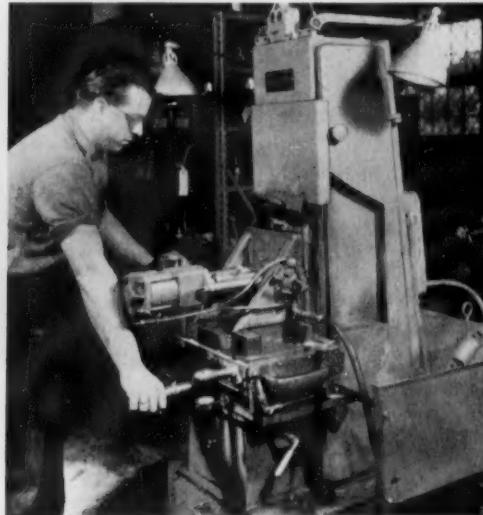
Significant new techniques in the coated abrasive grinding and finishing of metals were demonstrated recently to an estimated 3,000 production men from all phases of the metalworking industry and all parts of the country. The occasion was the Second Nation-

al Metal Finishing Show, sponsored by the Behr-Manning Co., Troy, N. Y., a division of Norton Company, at the abrasives manufacturer's clinic rooms, 4101 150th St., Cleveland, Ohio.

The purpose of the exhibit was to provide a clearing house of information and education on the many new developments in a technology which is expanding rapidly. The exhibit con-



A B&E 500 Contact Wheel Belt Grinder is shown being used for stripping fiber installation from rewound armatures of generators.



On this Engelberg Huller Platen-Type Grinder, a single coated abrasive belt removes $1/32$ inch from flanges of pump housings.

sisted of nearly 100 machine tools and metalworking machines, most of them developed within the past two years and many shown for the first time. They were the products of over 30 manufacturers who were guests of the Behr-Manning Company.

The first day of the event was devoted exclusively to editors of the metalworking and business press. Throughout the remainder of the week, the show was open to industrial production men. Scores of them brought actual workpieces for comparative testing on new equipment which ranged from huge automatic machines, destined for automobile and appliance production lines, to small specialty tools for such exacting work as removing defects from the contoured surfaces of jet engine blades.

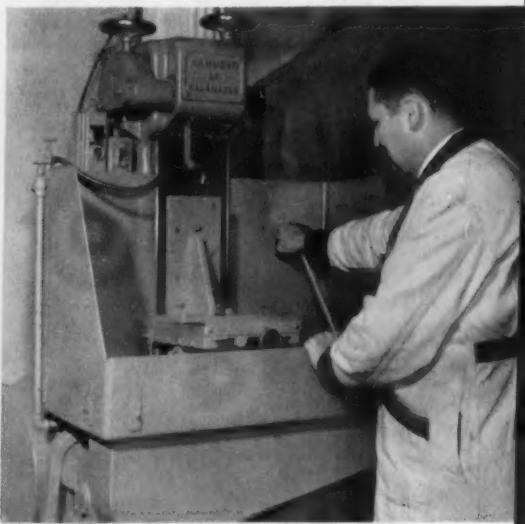
Specialty machines developed for grinding and finishing aircraft and engine components accounted for the presence of representatives from sev-



This Buckeye Air-Powered Vertical Sander spins a coated abrasive disc at 6,000 r.p.m. to put a smooth finish on refrigerator part.

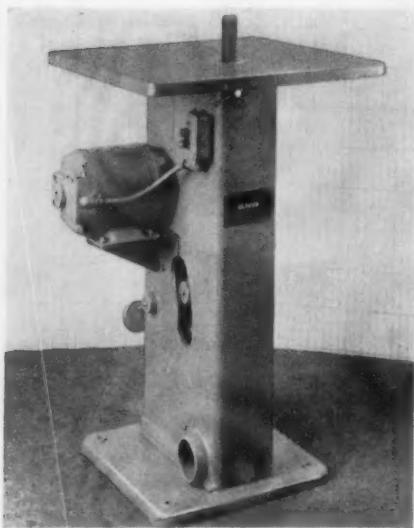


Operator uses a Sundstrand Twin Pad Sander to wet sand the primer coat on a giant steel control panel for a utility company.



Designed for close tolerance grinding and finishing, this Hammond Model V-8WP Vertical Platen Grinder may be run wet or dry.

news of the industry . . .



This Oliver 190-M Inside Edge Grinder drives a 1 x 132-inch belt at 5,400 s.f.p.m. over either of two ball-bearing platens.

eral West Coast plants. One of the largest automobile companies assigned its abrasives technicians to a two-day stay at the show, and a Rochester, N. Y., distributor underwrote the trip for customers who filled two railroad cars.

Features of the show included lecture-demonstrations by Behr-Manning scientists and engineers, and the showing of a new color film on the uses of abrasive discs in metalworking. The following companies exhibited at the show: Abrasive Machinery, Inc.; Acme Manufacturing Co.; Aro Equipment Corp.; B & E Manufacturing Co.; Stephen Bader & Co.; Black & Decker Manufacturing Co.; Buckeye Tools Corp.; Bush Manufacturing Co.; Chicago Pneumatic Tool Co.; Chicago Rubber Co., Inc.; F. L. & J. C. Codman Co.; Delta Division, Rockwell Manufacturing Co.; Detroit Surfacing Machine Co.; Engelberg Huller Co., Inc.; Fenlind Engineering Co.; Formax Manufacturing Corp.; Grinding & Polishing Machinery Co.; Hammond Machinery Builders, Inc.; Hill Acme Co.; Mead Specialties Co.; Mer-



A Skill Portable Air Tool combined with a Behr-Manning Resinall Metalite Spiraband is used for finishing automobile tail fin.



The many thin flexible "leaves" of coated abrasive make the Merit "Grind-O-Flex" Wheel well suited for polishing grooves.

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Here's a catalog that exactly fits in a machinist's tool box in more ways than one. Not only are the Putnam Catalog physical dimensions exactly proportioned to fit within standard tool boxes so that it will always be handy, but, conveniently listed and illustrated within the Putnam Catalog are over 1400 different types and sizes of standard end mills.

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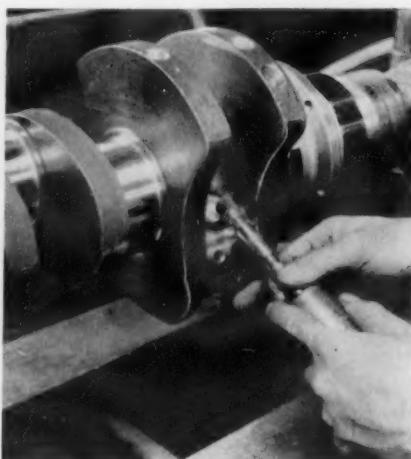
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Manufacturers of helical taper pins, chucking,
die makers and special reamers.

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178 modern machine shop



Removing scratches and burrs on the pin bearing walls of a diesel engine crankshaft using Rotor Model 827 High Cycle Portable Tool with a 1/2 inch Metalite Spiraband.

it Products, Inc.; Nazar Rubber Co.; Nicholas Equipment Co.; Nu-Matic Grinders, Inc.; Oliver Machinery Co.; Porter-Cable Machine Co.; Production Machine Co.; Rotor Tool Co.; Skil Corp.; Sundstrand Machine Tool Co.; and Syntron, Inc.

★ ★ ★

WELDING PROCESS AWARDS

Herman Tachau of Santa Fe, New Mexico, an engineer with the New Mexico State Highway Department, received the First Award of \$5,000 in the recent competition for ideas to accelerate the progress of arc welding, sponsored by The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio. The award was one of 20, totaling \$20,000, made to men in 16 states.

January, 1957

Set No. 84

VK GEAR MEASURING WIRES

A Complete Combination of 4 VK Gear Wire Sets covering Series 1.92, 1.728, 1.68 and 1.44



Illustrated above is the newest Van Keuren Gear Wire Set No. 84

Set No. 84 is a multi-purpose set designed to cover a range of 26 diametral pitches from 2 to 80 with wires from each of four different and popular wire series:— 1.92, 1.728, 1.68 and 1.44. Because of duplication of wire sizes, this set which would normally involve 104 sizes reduces to 84 sizes. The economy here is evident.

The latest VK Gear Measuring Tables, available in Catalog and Handbook No. 36, have been arranged for use with all four of these gear wire series. Thus the set can be used in conjunction with the tables in many ways, such as:

Tooth Thickness	Measuring tooth thicknesses of internal and external spur gears, splines and serrations.	Helical Gears	Measuring helical gears where normal diametral pitch is one of the 26 for which the set was designed.
Involute Profile	Checking involute profile by using more than one wire size. Series 1.92, 1.728 and 1.68 for externals. Series 1.68 and 1.44 for internals.	Enlarged Pinions & Reduced Gears	Measuring enlarged pinions and reduced gears. (Tables are now available for the first time in VK Circular G-8, giving measurement values and change factors for reduced gears which mate with pinions enlarged in accordance with the latest American Standard covering involute fine pitch gears).

Complete information regarding the use of gear measuring wires is contained in a fifty-page section of the VK Catalog and Handbook No. 36. Included in this section are the most complete gear measuring tables available, as well as all necessary formulas and equations for computing non standard spur and helical gears. Numerical examples are included. This book is available on request.

VK Gear Wires are held within .000025" for roundness and exact size. Surface finish is 1.5 RMS or better.

If complete coverage of all series is not necessary, sets covering single series such as 26 Ex. or 26 Int. are also available. See Catalog No. 36.

VK

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38th YEAR

175 WALTHAM STREET, WATERTOWN, MASS.

Optical Flats . . . Light Wave Equipment . . . Light Wave Micrometers . . . Gage Blocks . . . Wire Type, Taperlock and Trilock Plug Gages . . . Master Setting Disk . . . Thread Measuring Wires . . . Gear Measuring Wires . . . Carbide Plug Gages . . . Laps and Surface Plates . . . Precision Lapping Service.

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January, 1957

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news of the industry . . .

Mr. Tachau received the award for a complete and thorough outline of a plan to enable more engineers to design machines and structures for arc welding, rather than some other metal joining method. Dr. E. E. Dreese, chairman of the Lincoln Foundation, stated that the general theme of most of the ideas submitted emphasized this

need for greater education of the general public to the inherent advantages and economy of welded design in machines and structures of all types. Mr. Tachau particularly pointed to the structural field where he claimed a potential of some 3½ million tons of steel now riveted or bolted could be welded, thereby realizing a savings in material utilized of approximately 20 per cent.

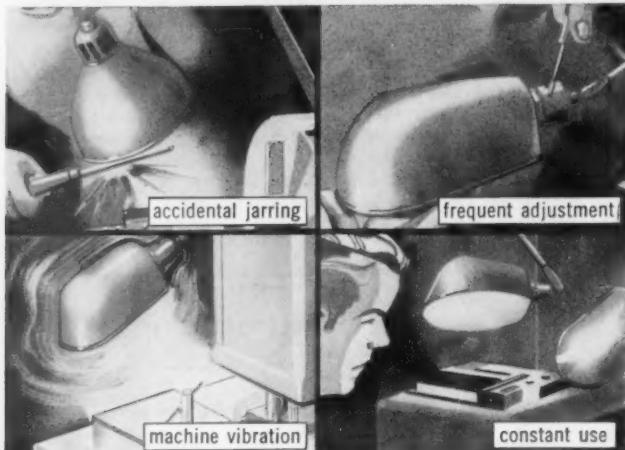
The Second Award of \$4,000 went to

Van Rensselaer P. Saxe, Baltimore, Maryland, a consulting engineer. T. C. Kavanagh, New York City, a consulting engineer, received the \$3,000 Third Award. Bruce G. Johnston, a professor of structural engineering at the University of Michigan, received \$2,000 and Orville T. Barnett and John Rudy, both of the Armour Research Foundation of Chicago, shared the \$1,000 Fifth Award.

Dr. Dreese also stated that many of the ideas received suggested that, to bring about greater public appreciation of welding, engineering schools need to give better coverage to the subject of welded design in structural and mechanical fields.

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THESE FEATURES CUT REPLACEMENT AND MAINTENANCE COSTS:

- Levolier® switch—the most dependable switch made
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Good News

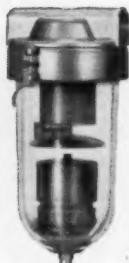
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ANNOUNCES

Important New Developments
in Compressed Air Filters
and Pressure Regulators



NEW Norgren Air Line Filters

- LESS PRESSURE DROP — larger passages and larger filter element.
- BETTER LIQUID REMOVAL — Improved louver plate and baffle design. Removes more liquid from the compressed air line.
- CHOICE OF FILTER ELEMENT — interchangeable filter elements, 74, 64, or 25 micron.

NEW Norgren Pressure Regulators

- GREATER ACCURACY OF REGULATED PRESSURE — balanced valve and increased effective diaphragm area provide improved accuracy over a wide operating range.
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news of the industry . . .



New Abrasive Division Plant for Albertson and Company, located in LeMars, Iowa

ALBERTSON AND COMPANY OPENS NEW ABRASIVE PLANT

Albertson and Co., Inc., Sioux City, Iowa, has opened a new plant in Le Mars, Iowa, for the production of Sioux Abrasive Discs. This plant is

located 25 miles north of the main Albertson Plant in Sioux City and is connected by a new four lane highway. The 125 by 200 foot windowless plant is air-conditioned, winter and summer both, for working comfort and for better quality control of the discs,

Specify KASSON Precision Collets and Attachments



3AT,
3C, 1A,
4C, 5C



480 (AC-50) PUSH
TYPE. All collets in
hexagon, square and
round for lathes,
milling machines, at-
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KLUTCH-KOLLET Stop
collet. Accurate chuck-
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Lowest price on market!
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1/2" cap.



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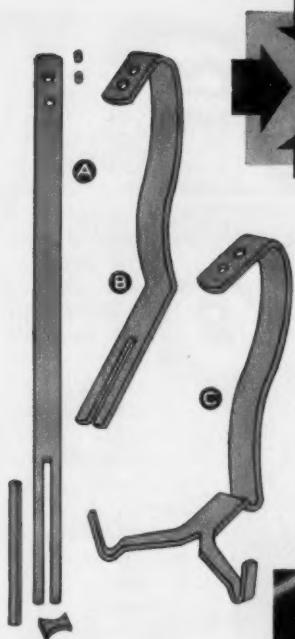
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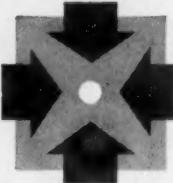
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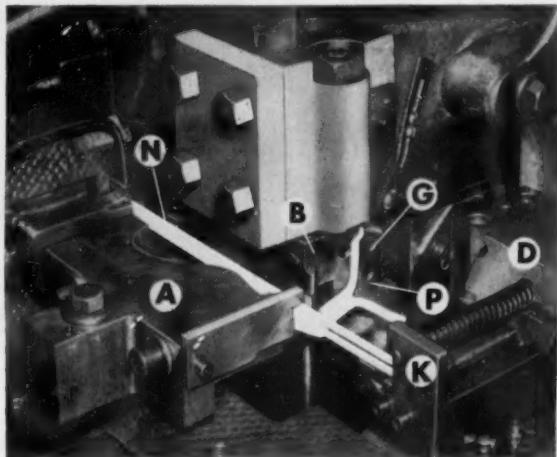
Stand is zinc-plated steel strip 0.05 in. thick by 0.625 in. wide . . . made in steps A, B and C.



Top performance in MASS PRODUCTION

60 vaporizer stands per minute . . . automatically formed in one operation on an A. H. Nilson combination press and 4-slide. Kaz products are proof that clever product design, combined with precision tooling by Nilson, increases production and lowers costs.

Without obligation, Nilson provides specific forming recommendations from detailed information. Send for A. H. Nilson catalogue . . . the first step to increased production.



Final step in forming Kaz stands on Nilson 4-slide. Feet are spread, bent, crimped (G) with workpiece (P) on centerpost while next piece (N) is being cut off. Stop (K) on right slide (D) backs off after cut and workpiece (P) is wrapped around centerpost by die (A) when finished part is clear.

A.H. NILSON

MACHINE COMPANY

1514 RAILROAD AVE. • BRIDGEPORT 5, CONN.

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January, 1957

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news of the industry . . .

which are effected by temperature and humidity variations.

Albertson manufactures abrasive discs in five, six, seven and nine inch diameters, coated with grits ranging in coarseness from No. 16 to 150. Sioux Auto Polish and Sioux-Venir Auto Wax will also be produced in the newly completed LeMars plant.

EXPANDED PIN GRINDING SERVICE

From the days of World War II, when the Commercial Centerless Grinding Co., Cleveland, Ohio, supplied millions of small precision pins to be used in the Norden Bomb Sight, this part of its business has continued to expand. According to the company, latest equipment permits the handling of coil or straight stock in any ferrous

or nonferrous materials. Small micro-inch ultra finish pins are made on equipment which is designed and built to accurately produce burr-free electronic bar control instrument parts.

Present equipment makes pins as small as 0.015 inch in diameter by 1/32 inch long and are held to 0.0001 inch diameter tolerance. When required, bearing quality surface of less than 3 RNS is available with substantiating surface analyses tape certifications.

Taper pins are produced, ranging down to 0.025 inch at the big end. These pins can be supplied in either ground precision tolerances or turned tolerances.

The
KALAMATIC
... makes sawing automatic



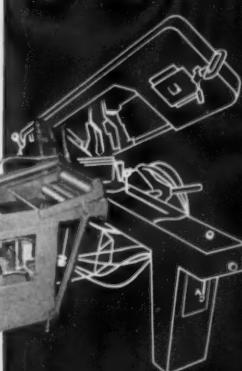
Featuring:

- Quick easy installation and adjustment.
- Accurate repetitive cutting with no intricate electrical equipment to go out of balance.
- Completely enclosed oil tank and ball bearing table rollers.

Machine Tool Division

Kalamazoo

AUTOMATIC BAR-FEED ATTACHMENT



The Kalamatic automatically feeds rounds, flats, hex, pipe, tubing to most Kalamazoo metal cutting band saws—any length from 3/16" to 30". Thoroughly automatic, The Kalamatic helps prolong the blade life of the saw.

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508 HARRISON ST.
KALAMAZOO, MICHIGAN

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ALL THREE!

OLD STANDARD LETTER DRILLS



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NUMBER DRILLS



NEW HI-SPIRAL CENTER DRILLS



CIRCLE R center drills include always-popular old standard letter drills, new standard number drills and our new Hi Spiral drills . . . superior for smoother work produced more efficiently; effectiveness assured because chips are cleared more easily.

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TUNGSTEN CARBIDE SAWS
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ERSINKS • CENTER REAMERS

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January, 1957

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news of the industry . . .

UNION TWIST DRILL ACQUIRES PLANT IN WEST GERMANY

The Union Twist Drill Co., Athol, Mass., has announced the purchase of major controlling interest in R. Stock and Co., West Berlin, Germany, and its wholly owned subsidiary, Hartex Machine and Tool Works, also of

West Berlin. R. Stock and Company is said to be one of the oldest and largest European manufacturers of twist drills and other metal cutting tools. In addition to its domestic business, the Stock Company also participates actively in the export of its products to many other countries throughout the world.

The Hartex Division manufactures several varieties of precision grinding machines including centerless, cylindrical and internal types which are sold in both the domestic and foreign markets.

Both the R. Stock Company and its Hartex Division occupy a 20 acre site in one of the industrial sections of West Berlin and employ approximately 1,000 persons. The West Berlin firm will be operated as a subsidiary of the Union Twist Drill Company. Additional new equipment, together with technical assistance, will be provided by the parent company.

The Union Twist Drill Company is currently operating three plants in the United States, one in Canada, and the present acquisition in West Germany becomes the fifth operating unit.

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ACME
DOWEL PINS

**ARE NOW SOLD ONLY THROUGH
INDUSTRIAL SUPPLY HOUSES**

Write for information and prices on micro, standard and tungsten carbide drill jig bushings, dowel pins, chamfer micrometer gages and portable bench centers.

★ Sizes from $\frac{1}{16}$ " to 6" in length— $\frac{1}{16}$ " to 1" in diameter. Standards and specials, including pins of stainless steel.

★ Precision pins, hardened and ground to .0002" or .001" over nominal diameter—oversized: .002", .003", .004" and .005".

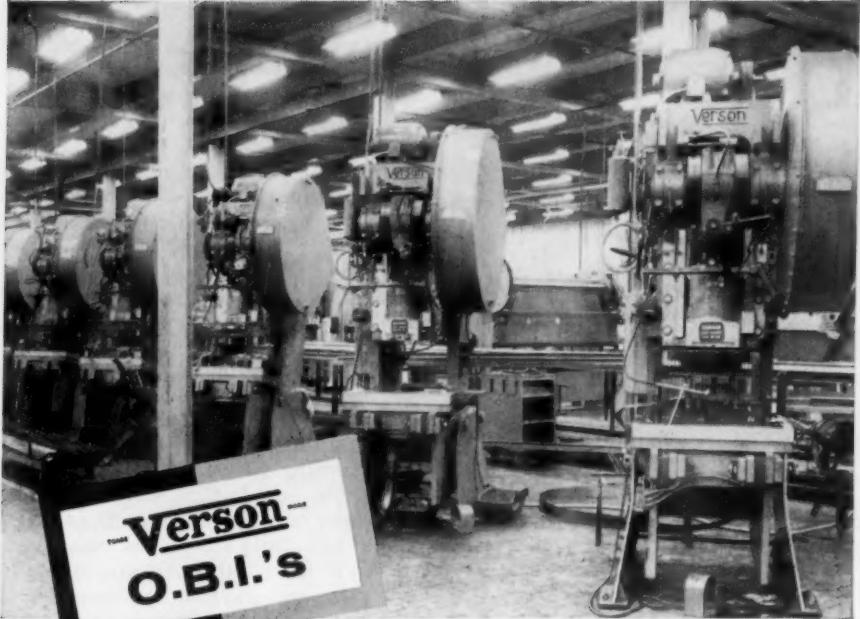
★ Acme Pins are case hardened to 60-62 Rockwell "C" scale and core hardened to 36-38.

★ Acme Pins will break before bending or mushrooming.

If your distributor does not yet stock Acme Dowel Pins, please send us his name so we may avail him of a stock. Also ask for Acme Dowel Pin Folder.

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engineered for quality performance

In O.B.I.'s, only Verson gives you all these big press design and construction features—

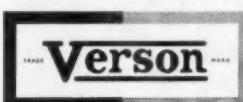
- Verson Allsteel Frame
- Mechanically interlocked pneumatic clutch and brake unit
- Steel gear and pinion operating in oil
- Split cap design main and crankpin bearings with renewable bronze bushings

Verson O.B.I. Presses are available in capacities from 90 to 250 tons in standard and special types. A Verson engineer will be pleased to help you select the O.B.I.'s best suited to your requirements. Call or write, today.

A Verson Press for every job from 60 tons up.



Write for Catalog OB-54 giving specifications and design details of Verson O.B.I. Presses.



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TOOLING • DIE CUSHIONS • VERSO-WHEELON HYDRAULIC PRESSES
For more data circle 334 on Reader Service Card

news of the industry . . .

WARNER AND SWASEY EXPANDS

Marking the beginning of an expansion program designed to increase its machine tool production capacity an estimated 25 per cent, The Warner and Swasey Company, Cleveland, broke ground recently for the first of two additions to its new Philadelphia, Ohio plant. The new building, to contain manufacturing and storage space totaling some 33,000 square feet, is expected to be ready for occupancy in April, 1957.

According to company announcement, the new facility will require the purchase of approximately 22 new machine tool units and, when completed, will add from 150 to 200 employees to the company payroll. Construction of the second plant addition, to be used mainly for sheet metal work, will begin shortly.

★ ★ ★

ADAMAS CONTRACTS FOR ISRAEL'S FIRST CARBIDE PLANT

Announcement was made recently by Adamas Carbide Corp., Kenilworth, N. J., of the signing of a contract with Iscar, Ltd., Nahariya, Israel. Iscar, Ltd., represents the first tungsten carbide manufacturing facility not only in Israel, but the entire Middle East.

Under the terms of this agreement, Iscar personnel will be trained at Adamas' Kenilworth plant. Under a long term contract, Adamas will furnish the necessary pressing and sintering equipment to be used in the manufacture of tungsten carbide tips, tools, dies and wear parts for the expanding Israeli metalworking industry. It is expected that the plant will be in full operation by early Spring of 1957.

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"PRODUCTION WITH PRECISION"

For more data circle 335 on Reader Service Card

This is the second foreign arrangement of this type concluded by Adamas. A plant is now in operation in Geneva, Switzerland, and two similar facilities are successfully operating here in the U.S.A.

★ ★ ★

NEW COMPANY IS ORGANIZED

Announcement was recently made of the organization of the Philip Tool Company, located at 11336 Schaefer Rd., Detroit 27, Mich. The founder and president of this company is Philip C. Satterthwaite, who was formerly vice president and factory manager of Cogsdill Twist Drill Company.

This new company is manufacturing and distributing nationally high-speed steel metal cutting tools. The line includes reamers, end mills, counterbores, center reamers and countersinks, both standard and special.

★ ★ ★

PARKER STAMP WORKS CHANGES NAME

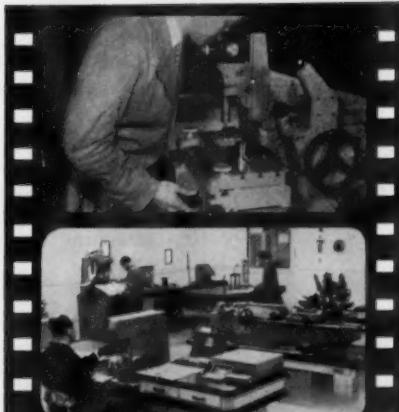
The Parker Stamp Works, Inc., Hartford, Conn., has changed its corporate name to avoid the confusion which has existed since the company began expanding into new fields of endeavor. The new corporate name is The Parker-Hartford Corporation.

★ ★ ★

PODLIN TOOL MOVES

Podlin Tool Co., recently moved to its new factory located at 11917 Franklin Park, Ill. The new quarters are being set up for producing two new products, stud sets and strap clamps, in addition to the company's line of clamp support blocks and lead hammers for industry.

January, 1957





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has developed from more than 90 years' specialization with practical metrology. The resulting SIP techniques—as used in length measurements by national Bureaus of Standards—may be most profitably applied with SIP UNIVERSAL & LINEAR MEASURING MACHINES, SIP high precision MICRO-INDICATORS, and SIP PROFILE PROJECTORS. How well these techniques and machines can work to your advantage is illustrated in the film offered below. For arrangements, write to:

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MEASUREMENTS"**

For more data circle 336 on Reader Service Card

modern machine shop 189

news of the industry . . .

NEWMAN M. MARSILIUS

Newman M. Marsilius, Sr., chairman of the board of The Producto Machine Co., Bridgeport, Conn., and a pioneer in many of the early developments in the milling machine field, died recently at the age of 66.

As president of Producto from 1928

until 1949 and then chairman up to the time of his death, Mr. Marsilius built the firm into a nationally known manufacturer of die sets, machine tools and toolroom equipment.

★ ★ ★

N.T.D.M.A. HOLDS CONVENTION

The National Tool and Die Manufacturers Association recently held its eleventh annual convention in Hartford, Conn. The Association elected the following officers for the 1956-1957 term: Herbert Harig, president of Harig Manufacturing Corp., Chicago — president; Philip R. Marsilius, vice president of The Producto Machine Co., Bridgeport, Conn. — first vice president; Jack Kleinoder, secretary-treasurer of Volkert Stampings, Inc., Queens Village, N. Y. — second vice president; Robert C. Renner, president of The East Dayton Tool and Die Company, Dayton, Ohio — re-elected treasurer; and Harold G. Murdock, vice president of Arrowsmith Tool and Die Corp., Los Angeles — re-elected secretary.

UNMATCHED Repeatability

WITH

Em-re

DIAL INDICATORS

THE ONLY

100% SHOCKPROOF DESIGN

Patents Pending.

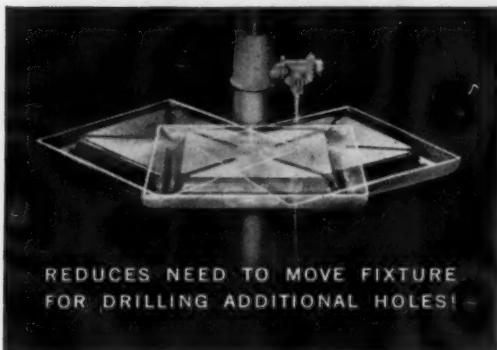
There's never been a dial indicator like the "Em-re." It combines a new and greatly simplified design with a fully jeweled gear mechanism that is indestructible. As a result it gives you readings of previously unobtainable accuracy — accuracy that will repeat itself without deviation through millions of measurements. "Em-re" .00005" and .0001" models, for example, provide repeated readings to an accuracy of better than .00002". And the completely shockproof "Em-re" system preserves and actually contributes to this repeatability over a lifetime of service. Stocked in 26 models, 8 ranges from .002" to 1.000"; graduations in .00005", .0001", .00025", .0005" and .001". Also available for accurate indicator testing — the "Master" Dial Indicator Checker.

Write for Catalog F.

PETZ-EMERY INC.
PLEASANT VALLEY, NEW YORK

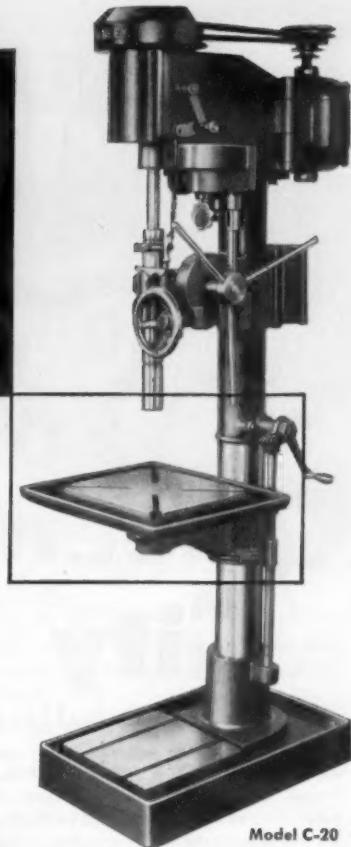
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Sibley Table Swing Saves Set-up Time!



Lick largest cost item in toolroom, die shop—or small lot production! Rapid positioning by rotating table arm overcomes need to change set-up.

- Geared power feeds. Dial selection.
- Back gears for extra power.
- Drills 1½" in steel plate.
- Accurate, Rugged, Convenient controls. Eight spindle speeds.
- Sensitive for "feel" of job.
- 20" swing, 2 h.p. motor.



Model C-20

Send for

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SIBLEY
MACHINE & FOUNDRY CORP.
SOUTH BEND, INDIANA



SIBLEY MACHINE & FOUNDRY CORP.
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FOR LESS!

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grinders and buffers

You save when you buy and when you use QUEEN CITY Grinders and Buffers. Priced 20 to 30% under competing tools, they're built to stand up under the hardest use. Extra heavy spindles, extra duty ball bearings and special motors all contribute to long, low-cost service. 30-Day Trial Offer!

There is a complete range of QUEEN CITY Grinders and Buffers . . . floor and bench types . . . in sizes from $\frac{1}{3}$ to 10 H.P.

Write For Free Catalog Today!

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"High Quality—Low Cost—Fast Over 50 Years!"

For more data circle 339 on Reader Service Card

192 modern machine shop

news of the industry . . .



Herbert Harig (left) and P. R. Marsilius

George S. Eaton and Charles R. Bender continue to serve as executive secretary and assistant executive secretary, respectively.

★ ★ ★

U. S. STEEL SUPPLY INAUGURATES "GRADE MARK" SERVICE

U. S. Steel Supply Division, Chicago, Ill., has developed a new method of pre-marking steel items to aid customers in speedy deliveries and quick storage. The national warehousing division of U. S. Steel Corporation worked with its sister division, Gerrard Steel Strapping, to design the new approach to materials handling.

Called "Grade Mark" service, special lithographed seals have been developed to identify grades of cold finished steel bars shipped to Supply Division customers. The bars are delivered banded together with flat steel strapping which is clamped tight by the special seal plainly marked to show the grade. Each bundle with $\frac{3}{4}$ inch Gerrard steel strapping and fastened with a closed lithographed seal imprinted with the division insignia

January, 1957

RADIAC®

TYPE "JH" ABRASIVE CUT-OFF MACHINE

FOR WET CUTTING ONLY

**CUTTING HEAD OPERATES
EITHER MANUALLY OR
HYDRAULICALLY -- WITH
VARIABLE FEEDS & STROKES**

**Increases production
through ease of operation**

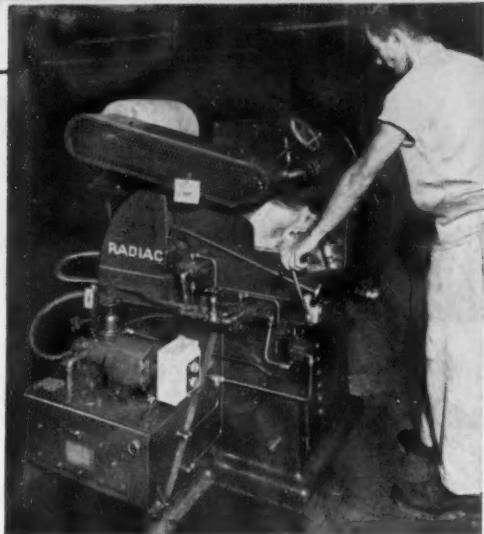


Photo through courtesy of Standard Pressed Steel Co., Jenkintown, Pa.

Operated by a 10 H.P. Motor and using an 18" Rubber Bonded RADIAC Abrasive Blade, this de Sanno Type "JH" Abrasive Cut-off Machine introduces new production economies and operating efficiency. Its hydraulically operated cutting head reduces operator fatigue. It features a foot treadle for operating the work vise, and an emergency reversing rod with mushroom button. Specially designed for production cutting of steel bars up to 2½" D., and tubing up to 4" O.D.

There are 10 other types of RADIAC Cut-off Machines—and a complete line of Abrasive Cut-off Blades—to meet your specific requirements. Write for illustrated Bulletin today. Exclusive dealers located throughout the United States.

Use RADIAC Blades with RADIAC Machines

A. P. DE SANNO & SON
INCORPORATED

**PHOENIXVILLE
PENNA., U.S.A.**

Manufacturers of Abrasive Cut-off Machines • Abrasive Cut-off Blades • Grinding Wheels
For more data circle 340 on Reader Service Card

news of the industry . . .



U. S. Steel Supply Division's recently developed "Grade Mark" customer service

and grade of steel. Seals are pre-marked by Gerrard and stocked in

handy locations at the Supply Division's 18 warehouses ready for immediate use in banding operations. They bear markings for standard steel grades, ranging from 1,018 to leaded screw stock.

★ ★ ★

NORTON ACQUIRES PLANT IN BRAZIL

Norton Co., Worcester, Mass., has acquired a controlling interest in Abrasives Irarmos Meyer, S. A., Sao Paulo, Brazil. This firm manufactures coated abrasives, grinding wheels and abrasive grain. This will be the second Norton plant in South America. In March, 1956 controlling interest in Compania de Lijas y Esmeriles of Buenos Aires was acquired. The Argentine company manufactures a complete line of coated abrasives.

the
ARC-TWIN Cuts Two Perfect Notches
in One Downstroke of Press!

SAVING both time and cost, it gives you perfect T-joints — instantly ready for welding or brazing without deformation or finishing!

Twin-acting punch shears clean, from inside out, leaving two matching notches (in perfect 180° alignment) with every downstroke of the punch press. Quickly interchangeable dies and punches accommodate pipe and tubing from $\frac{1}{2}$ " to $2\frac{3}{8}$ " O.D.; special units, up to 3" O.D.

Special Arc-Twins for double notching stainless steel or monel metal and units built to your specifications can also be furnished.



PATENTED

Ask for
twin-notched
sample of
pipe
or tubing

VOGEL

TOOL AND DIE CORPORATION

1823 North 32nd Avenue
Melrose Park, Illinois

For more data circle 341 on Reader Service Card

NOW BETTER GROUND FINISHES!

with J&S guaranteed* self-adjusting
live centers



ACCURACY .0001"

OR LESS

FOR LATHES, GRINDERS

PERFECTION LIVE CENTERS

SPINDLE TYPE

"GUARANTEED 2000 HOURS OR 1 YEAR

SIMPLE DESIGN:

Only six parts. One-piece main body serves as cup for roller bearing on which spindle turns. Allows much greater capacity bearing in same size body.

AUTOMATICALLY ADJUSTS FOR WEAR:

End thrust from work keeps tapered roller bearing perfectly seated—bearing cone and inner race of ball bearing are pressed on spindle; outer race is a light press fit into main body.

ABSOLUTE CONCENTRICITY AND ALIGNMENT FOR BEARINGS:

Both conical and cylindrical bores of body are ground at same setting in work head. Point is ground under load in its own bearings to insure running dead true.

TAPERS AVAILABLE

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CLAMP CUT

ONE 841

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LIVINGSTON, NEW JERSEY

For more data circle 342 on Reader Service Card

Better Service on STAMPINGS is as simple

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NO DIES! Our machine cut method, applying custom-built slitters, cutters, saws, files and stock punches—PLUS special techniques and skills—produce these small quantities at very low cost.



TEMPORARY LOW-COST TOOLING! To produce something more than a few, but less than high production quantities, our simple contour dies—PLUS special purpose presses—keep costs low.



MODEST DIE CHARGES on larger quantities! Here is where our regular production toolings apply to advantage...to deliver high quantity Stampings, and at lowest possible unit cost.

You can rely on it...we look at all 3 Stamping techniques, each our exclusive development...to determine the best method for fast, efficient, low-cost Service on any quantity—one to a million!

Free 12-page booklet shows how to save on stampings...write for it.



**STAMPINGS
DIVISION**

3301 Union Street, Glenbrook, Conn.
For more data circle 343 on Reader Service Card

news of the industry . . .

NATIONAL ACME HONORS BOARD CHAIRMAN

Frederic H. Chapin, chairman of the board and president of The National Acme Co., Cleveland, Ohio, was honored recently by the unveiling of his portrait at his company's monthly board meeting. The directors of National Acme commissioned Rolf Stoll, nationally recognized portraitist of leading business and industrial leaders, to paint Mr. Chapin's likeness to commemorate his 30 years of active leadership.

Mr. Chapin became president of National Acme on July 28th, 1926; he was elected board chairman on March 23rd, 1933 and has continued to serve in both capacities since that time. Under his direction, the company, a large builder of a complete line of single and multiple spindle bar and chucking automatics, has achieved an enviable financial position while, at the same time, continuing steady growth and diversification of products.



Portrait showing Frederic H. Chapin

CLEEREMAN

DRILLING MACHINES

A battery of box column and round column Cleereman

Drilling Machines on production work. One of many such installations producing at lower costs with higher production, less operator fatigue and no down time.



AYOUT DRILLING MACHINE

A modern solution to an old problem. Built for those tool room and manufacturing jobs which do not require the ultra precision of Cleereman Jig Borers. The Cleereman Layout Machine is an economical machine capable of locating within .001" per foot and drilling, boring, reaming, tapping, etc., with utmost operator ease at a fast rate of production.

JIG BORER

Unexcelled precision for ultra-fine tolerances on highest quality gage, tool, die, jig and fixture work and on "jigless" production. Combines stamina with precision and ease of operation.

Prepositioning power rapid traverse is available on all models.



CLEEREMAN MACHINE TOOL CORP., Green Bay, Wis.

For more data circle 344 on Reader Service Card

news of the industry . . .

CHICAGO FLAME HARDENING COMPANY MOVES INTO NEW QUARTERS

The Chicago Flame Hardening Co. has opened a new plant located at 420 East 151st St., East Chicago, Ind. This new flame hardening plant is designed to provide fast, efficient service for hardening all types of iron and steel products. John R. Keeler, general manager of the new plant, announced that this plant will provide not only such customary services as the flame hardening of steel and cast iron rolls, gears and machine ways, but will, in addition, work closely with industry at the design stage in order to boost production and reduce costs.

The Chicago Flame Hardening Co., though prepared to flame harden all types of machine components, emphasizes the special advantages afforded producers in the processing of extra large parts. The company is equipped to handle and harden individual pieces up to 20 tons in weight, utilizing overhead traveling cranes, private railroad siding and a 90 ft. truck dock.

For more data circle 79 on Reader Service Card

CORRECTION

In the R. L. Spellman Company advertisement which appeared on Page 260 of the December 1956 issue, the price given for a matched set of "Spelmanco" Transfer Punches should have been \$17.90. This price has been in effect since October 1, 1956.

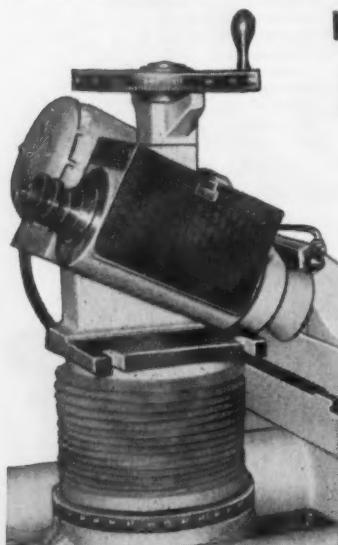
★ ★ ★ ★

NEW 25° Tilting Spindle

makes set-ups easier on the

STERLING "G-2"

Tool & Cutter Grinder



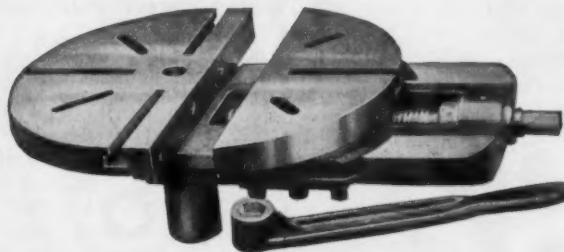
Direct, positive clearance angle setting, without formulas, saves set-up time, assures accurate grinding. Extra capacity (10 $\frac{3}{4}$ " swing), complete flexibility and rugged construction give the STERLING "G-2" maximum versatility. Available in plain and universal models. Write for details and low prices.

McDONOUGH
MANUFACTURING CO.

1521 GALLOWAY, EAU CLAIRE, WISCONSIN

For more data circle 345 on Reader Service Card

**For Faster, SAFER Work
in Your Maintenance Department**



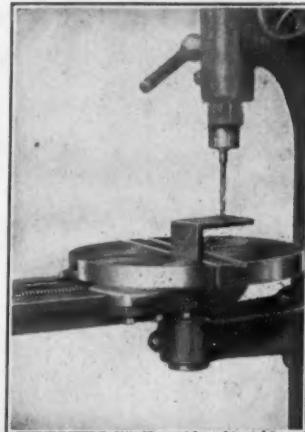
**Under Our
FREE
TRIAL
OFFER**

Try the MODERN SAFETY DRILL TABLE

Combines a drill table, a vise, a set of parallels and V block. No more lost fingers, from hand held jobs that slip. No more 30 minutes set-ups for a 1 minute drilling operation. Made in 6 sizes, from 8" to 28" dia. We guarantee each Safety Drill Table will save its cost on labor alone in 6 months, to say nothing of plant down time when vital maintenance is delayed even a few minutes

WRITE FOR FREE FOLDER

Shows many typical set-ups, and use in radial drills. Complete specifications on all models. Covers MONEY BACK GUARANTEE and 30 DAY FREE TRIAL OFFER.



**MODERN MACHINE TOOL CO.
2005 LOSEY AVENUE
Jackson, Michigan**

For more data circle 346 on Reader Service Card

Industry news in brief . . .

Lawton Howell appointed general supervisor of mill accounting, Crucible Steel Company of America, Pittsburgh, Pennsylvania. Edward J. Welsh appointed works controller in Syracuse, New York. Herbert J. Arnold appointed supervisor of stainless

flat rolled product sales. Frederick H. Thoke appointed supervisor of stainless bar wire and billet product sales. Regis O. Bridge appointed director of purchases. Charles E. Knox appointed manager of process engineering and production control department.

George M. Chandler named sales manager, Carmet Division, Allegheny

Ludlum Steel Corporation, Pittsburgh, Pennsylvania. Carl B. Pollock elected vice president in charge of manufacturing planning and policy. Merle J. Graham, elected vice president in charge of production; Dr. Rush A. Lincoln elected vice president and technical director; John E. Groves elected vice president of industrial relations. Harvey B. Lucas and John H. Snedeker added as salesmen to represent northwest coast area.



MULTI-DIAMETER CUTTERS

Perform two operations or more at once, eliminating waste set-up time.

Send us your blueprints for prompt quotations

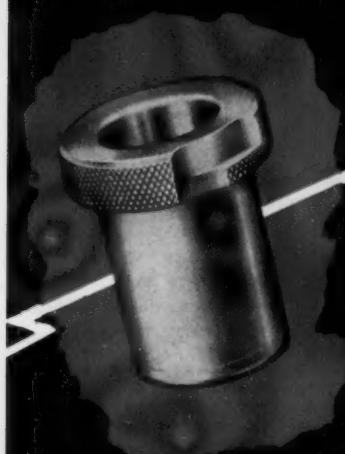
B&W PRECISION PRODUCTS CO.

11393 E. Eight Mile Rd., P.O. Box 3865, Detroit 5, Mich.

For more data circle 247 on Reader Service Card

NO BLACK MAGIC OR "HOCUS-POCUS"

We have no Secrets!



... JUST THE BEST DRILL BUSHINGS!

With precision American drill bushings you get: the *best* tool steel for extra long bushing life; the *best* 100% concentricity inspection; the *best* ordering method — eliminates confusing code numbers; the *best* range of standard sizes — smallest to the largest; and the *best*, most complete local stocks anywhere. Because we specialize only in the manufacture of drill jig bushings, American is your *best* drill bushing buy!

Send for our new 1957 catalog, price lists, and name of exclusive distributor near you.

American

DRILL BUSHING CO.

5107 PACIFIC BOULEVARD

LOS ANGELES 38, CALIFORNIA

For more data circle 348 on Reader Service Card

industry news in brief . . .

John M. Dolan appointed vice president-general manager, Field Sales Division, Giddings and Lewis Machine Tool Company, Fond du Lac, Wis.

John R. Gorey appointed sales promotion manager, Lindberg Engineer-

ing Company, Chicago, Illinois. Earl G. Olsen appointed manager of sales office, Rochester, New York.

Frederick H. Clarkson, Jr., appointed advertising manager, Taft-Peirce Manufacturing Company, Woonsocket, Rhode Island.

John Burg named eastern district manager, Kearney and Trecker Corporation, Milwaukee, Wisconsin.

Alfred Hostvedt appointed metropolitan New York manager. The Syracuse Supply Company appointed dealer representative in the Buffalo, Syracuse and Rochester areas.

Edward H. Jacobs appointed works manager, Abrasive Machine Tool Company, East Providence, Rhode Island.

Richard F. Shelley has joined Van Norman Machine Company, Springfield, Massachusetts, as chief electrical engineer.

Frank J. Hodder, Jr., appointed general manager, Pump Division, Brown and Sharpe Manufacturing Company, Providence, Rhode Island.

More per hour with MEAD WORK FEEDERS

Feed work fast to drill, tap, broach, mill. Delivers, holds, ejects stampings, castings, screw machine parts up to 3"-thousands per hour. Combines with MEAD Timers and Drill Press Feeds for easy, cost-saving automation.



Send for new Air Power catalog today!
(See Thomas' Register for nearest distributor's address, phone number.)



MEAD
SPECIALTIES COMPANY

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PATHFINDER IN AIR POWER AUTOMATION

For more data circle 349 on Reader Service Card

Low cost—high speed hard-facing with the new METCO THERMO SPRAY process

Hard-facing pump rod with
the Metco Type P ThermoSpray Gun

High spraying speeds—high deposit efficiencies — simplified application

The advantages of applying hard-facing materials in powder form for lower finishing costs have long been known. But slow spraying speeds, low deposit efficiencies and high material costs have hindered their wide application. Now, with the development of the new METCO Type P THERMO SPRAY GUN and the THERMO SPRAY Hard-Facing Alloys, these disadvantages have been overcome.

The THERMO SPRAY GUN is the first ever developed to operate without compressed air—only oxygen and gas (acetylene or hydrogen) are required. The THERMO SPRAY Powders are new, self-fluxing alloys of the nickel-chromium-boron type especially developed to provide dense, corrosion-resistant coatings with hardnesses varying from RC-30 to RC-65, depending on the alloy used. The new Gun applies these materials

faster than any previously available equipment (8 to 10 lbs. per hr.), with deposit efficiencies of over 95%. Depending on requirements, coatings may be fused after spraying, used semi-fused with a newly developed *Metco Process*, or left unfused.

Here is your opportunity to do your own hard-facing at low cost. For further information send off the coupon. No obligation, of course.



Metallizing
Engineering Co., Inc.

1177 Prospect Ave., Westbury, L. I., New York

Telephone: EDGEWOOD 4-1300

In Great Britain: Metallizing Equipment Co., Ltd.
Chobham near Woking, England

The following trade names are the property of
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Don A. Watson
Metallizing Engineering Co., Inc.
1177 Prospect Ave., Westbury, L. I., N. Y.

Please send me more information

- about the New ThermoSpray Gun
- about ThermoSpray Hard-Facing
- Please arrange a demonstration in my shop.

For more data circle 350

name _____

company _____

street _____

city _____ zone _____ state _____

on Reader Service Card

new shop equipment

**Descriptions of new machines, tools
and materials for metalworking.**

ALL ANGLE PRECISION BORER

The Oerlikon UB2 All Angle Precision Borer has been introduced by Olkon Research Corp., 630 Fifth Ave., New York 20, N. Y. This borer combines a radial swivelling arm with a freely swivelling head and is claimed to be capable of tackling any job, even

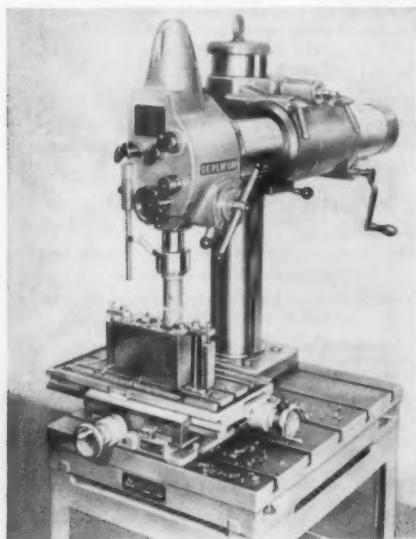
in the most awkward positions. This machine has been engineered to perform a variety of general workshop operations, such as drilling, milling, countersinking, tapping, precision and counterboring, reaming, facing, trepanning and so on. The boring head can be canted to any angle (360 degrees) and latched accurately into the vertical and horizontal positions.

A precision double row roller bearing at the bottom of the quill is said to insure the performances of a true boring spindle. The range of speeds (30 to 3,070 r.p.m.) and three power feeds, combined with a compound table for coordinate location, make the UB2 suitable for toolroom work. As a portable radial drill and borer, this machine has been found very useful in the fitting section or for production work in combination with other machines, such as horizontal boring and milling machines.

The self-contained drilling and boring unit, as well as the precision compound table, can also be used independently for many special workshop purposes.

Accessories include: precision chuck, tapping heads, collet holder, adjustable boring head, facing and turning head, trepanning tool, boring bars and so on.

For more data circle 80 on Reader Service Card



Oerlikon UB2 All Angle Precision Borer

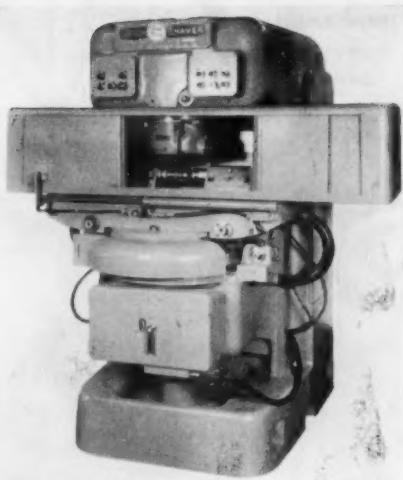
GEAR SHAVER FEATURES NEW COLUMN DESIGN AND BUILT-IN CONTROLS

An improved line of Red Ring Model GCU-8 and 12-inch rotary gear shaving machines, featuring a new column design and built-in pushbutton electrical controls, is now available from National Broach and Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. Tunnels cast in the column provide space for electrical controls and enable compact flush-mounting of the two machine pushbutton control panels in the top of the column within easy reach of the operator.

The new design also has separate cutter drive gear box in the top of the column. This is claimed to simplify column construction and maintenance procedures over the former design which had the gear box cast as part of the column.

The improved Model GCU-8 inch machine, shown in the accompanying illustration, is equipped for semi-automatic loading and shaves a helical transmission gear. This machine will shave spur or helical gears up to 4 diametral pitch having pitch diameters from one to eight inches. Model GCU-12 inch improved models shave spur or helical gears up to 4 diametral pitch with pitch diameters from one to 12 inches.

Both models are made in three different types. The first type is a universal machine that provides for conventional shaving of gears including crowned and tapered gears. Diagonal shaving with two-stroke or multi-stroke cycles can also be performed in conjunction with an automatic differential upfeed on the universal type machines. The second type resembles the universal model with the exception that it does not include crowning or taper shaving attachments. The third type of gear shaving machine being



Red Ring Model GCU-8 Inch Shaving Machine

made by the company provides only for basic diagonal shaving with the two-stroke cycle.

For more data circle 81 on Reader Service Card

★ ★ *

EASY TO REMOVE ABRASIVE TANK FEATURED ON LAPPING MACHINE

Announcement was recently made by the Spitfire Tool Co., 2931 North Pulaski Rd., Chicago 41, Ill., that a unique detachable abrasive tank, that is claimed to cut machine maintenance and abrasive refill time for the push-button Gyro-Matic "21" Automatic Lapping Machine, is now standard equipment on the unit. This innovation is said to permit precision flat lapping of piece parts on almost a non-stop production basis with the Gyro-Matic "21."

Detaching the complete abrasive tank requires the loosening of only three screws. The electrical connections, which supply current for the agi-

new shop equipment . . .



Spittfire Gyro-Matic "21" Lapping Machine equipped with easy to remove abrasive tank

tator motor and the electric solenoid, can be instantly disconnected by a simple twist of two twist lock connections. These simple operations permit operators to clean the abrasive tank, feed line and visible sight gage in minimum time. The solenoid valve is an integral part of the tank and it also may be cleaned in a matter of moments by pressure cleaning with an air hose when the tank is detached from the lapping machine.

Other design features are included in the Gyro-Matic's abrasive tank to assure easy, fast maintenance. The lightweight aluminum tank cover is also removable with the loosening of only three screws. This means when change of grit is necessary for different types of lapping operations, changeover takes only a few moments. In addition, the specially built half inch neoprene paddle, located inside the tank to keep grit and vehicle in correct suspension and prevent grit from collecting along tank sides, is replaceable in seconds. When cleaning

and maintenance work has been completed and the tank is ready for mounting on the Gyro-Matic, a locating ring at the base of the tank provides a positive, simple guide to placing the tank in the correct position on the machine.

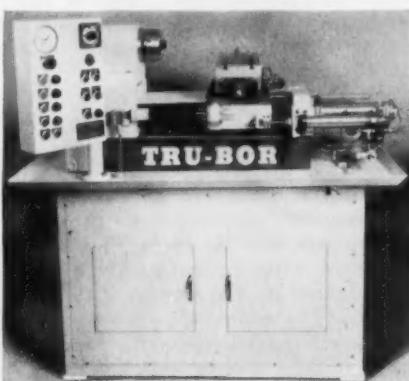
For more data circle 82 on Reader Service Card

★ ★ ★

COMBINATION BORING AND FACING MACHINE

H. L. Hampton, Wyandotte Rd., Willow Grove, Pa., has announced a precision boring and facing machine with finger-tip instant automatic controls for finishing of instrument, electronic and aircraft parts, housings and castings which require a high degree of accuracy. Designated as the Tru-Bor, this unit is designed to machine parts repetitively in a straight boring as close as 0.0002 inch and, when indexing the cross slide, tolerances as close as 0.003 inch are said to be attained under normal conditions.

This compact machine measures only 36 by 60 inches and weighs approximately 1,200 pounds. It combines several features including the Thy-

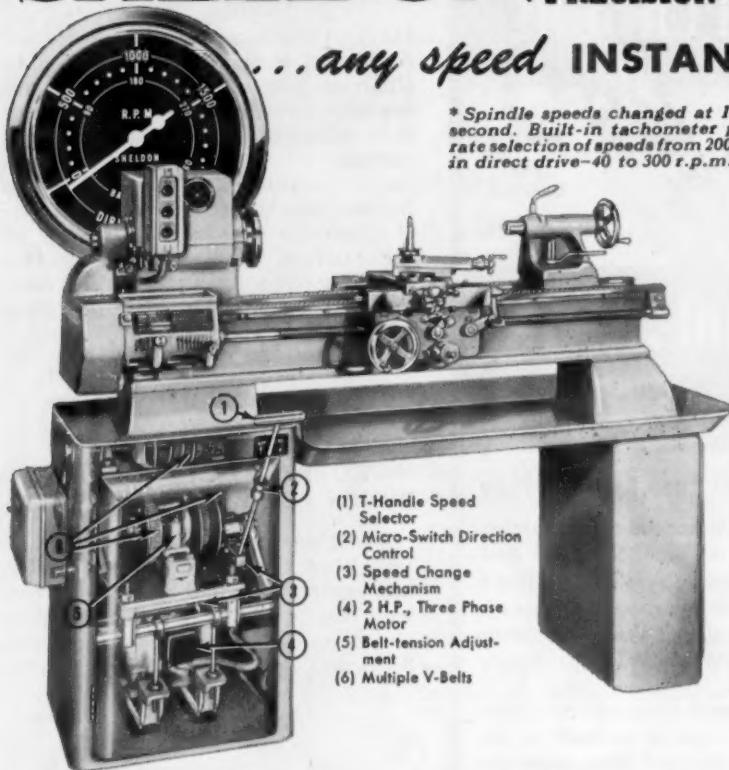


Hampton Tru-Bor Boring and Facing Machine

SHELDON Variable Speed PRECISION LATHES

...any speed INSTANTLY*

* Spindle speeds changed at 100 r.p.m. per second. Built-in tachometer permits accurate selection of speeds from 200 to 1800 r.p.m. in direct drive—40 to 300 r.p.m. in back gear.



This new lathe instantly meets every changing speed requirement in the tool room, or quickly sets and holds to any prescribed speed for production runs.

Rugged, Heavy-duty Variable Speed Drive—an oversized unit with double V-belts throughout that delivers positive full-power to the spindle.

High Spindle Speeds—from 200 r.p.m. to 1800 r.p.m. (direct drive), from 40 r.p.m. to 300 r.p.m. in back gear.

Instant and Automatic (power driven) Speed Selection—Only 9 seconds to change from low to high speeds in either direct drive or backgear. Speeds are changed automatically when T-handle is lifted or pushed into engagement.

High Horsepower at All Speeds—Because the drive unit is oversized, it has larger belts which deliver maximum gripping power at all speeds. A 2 H.P., three Phase motor recommended.

Additional lathe features: Zero Precision tapered roller spindle bearings, 54 pitch gear box, heavy cast pedestal, tool-room accuracy. Optional accessories include hardened bed ways, L-60 long taper key drive or 4" D1 Camlock spindles.

Sheldon Precision Variable Speed Drive Lathes are available in 11" or 13" Swing. Model WM-56-P (Illustrated) less motor and switch, \$1,944.00 F.O.B., Chicago. Other 10", 11", and 13" Sheldon Precision Lathes from \$832.00 up. Also 13" and 15" Sebastian Geared Head Lathes, Sheldon Milling Machines and Sheldon Shapers.

Write for Catalog

SHELDON MACHINE CO. INC.

For more data circle 351 on Reader Service Card

4240 N. KNOX AVE. • CHICAGO 41, ILL.

new shop equipment . . .

SUPERBORE

3 SIZES

1/64" OVERTSIZE
1/32" OVERTSIZE
STANDARD SIZE

Counterbores

NEW!

30° Right Hand Spiral, 4 Flute

Now you can speed up production 100% with our *New* 30° fast right hand spiral, four-flute counterbores.

You will find that faster feeds are possible with this freer-cutting tool.

Hardened counterbore blanks in stock can be ground to any special pilot and flute diameters in one week.

Complete Reamer catalogue with world's Greatest Reamer selection by the Thousands' and thousands. Write for it today!



**TWENTIETH CENTURY
MANUFACTURING CO.**
ROUTE 176 and BRADLEY ROAD
BOX 429-M, LIBERTYVILLE, ILL.

For more data circle 352 on Reader Service Card

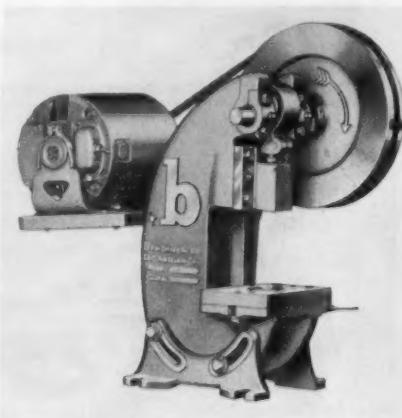
208 modern machine shop

Mo-Trol Drive, which is ready for action in 60 seconds and is claimed to eliminate the lost time for warm-up; five-stop electrically-operated cross slide adjustments and rapid traverse carriage action for longitudinal feed. In combination with the cross slide, the tool can be set for three additional diameters or retracted speedily to the starting position. The Tru-Bor base has the front and rear end castings resting on a black diabase plate which is flat within 0.00005 inch. For more data circle 83 on Reader Service Card

★ ★ ★

IMPROVED 2-TON PUNCH PRESS

Benchmaster Manufacturing Co., 1835 West Rosecrans, Gardena, Calif., has equipped its 2-Ton Punch Press with the same type of heavy-duty clutch recently installed on the 5 and 8 ton models. This clutch design con-



Benchmaster Improved 2-Ton Punch Press

January, 1957



Five sizes of M & M circular sawing machines cut off stock, ferrous or non-ferrous, from $\frac{1}{4}$ " through 43".

"Own your own". For many reasons — time, production, accuracy, cost — it pays to sharpen your own blades.



Let the Triple-Chip Method make money for you. Segmental type and solid blades 8" through 108" diameter.



TRY THE MOTCH & MERRYWEATHER

Combination TO HIGHER PRODUCTION, ACCURACY, PROFITS



Get the most from your cut-off dollars. That means using the Motch & Merryweather circular sawing combination. There's no other way . . . With your own M & M automatic grinder you save days of time, save transportation and other expense, use blades longer, and control work quality . . . Let a Motch & Merryweather specialist demonstrate.

★ ★ ★
Ask for our NEW Circular Sawing Bulletin.

★ ★ ★
**THE
MOTCH & MERRYWEATHER
MACHINERY CO.**

MACHINERY MANUFACTURING DIVISION
CLEVELAND 13, OHIO

Builders of Automatic Precision Cut-Off, Milling and Special Machinery

For more data circle 353 on Reader Service Card

new shop equipment . . .

tains an oversize, sliding-key type clutch dog encased by a strong steel collar which removes the driving load from the crankshaft keyway. The design was originally perfected for the 8-ton punch press, adopted as standard on the 5-ton models and is now standard on the 2-ton Benchmaster.

For more data circle 84 on Reader Service Card

**RELAY SERIES REQUIRES
LESS THAN ONE CUBIC
INCH OF SPACE**

A subminiature three-pole relay series, which occupies less than a cubic inch of space, has been introduced by Potter and Brumfield, Inc., Princeton, Ind. Designated as the KM, the series is engineered to meet the pressing demand for miniaturization and multiplicity of action within a single relay.

Applications for this relay cover a wide field of diverse products typified by small business machines, alarm systems, automated toys, remote controls and various types of intercom systems.

The relay is designed for a temperature range of minus 45 to plus 55 degrees C. The unit measures 1 $\frac{1}{8}$ inch long by 17/32 inch wide by 15/16 plus or minus 1/64 inch high. The complete relay weighs approximately 7 $\frac{1}{2}$ ounces.

For more data circle 85 on Reader Service Card



**low
cost
precision
stamping
with
KENCO
1½ to 15 ton
PUNCH PRESSES**

Low cost because Kenco presses are quality-built throughout to produce at top speed, and with the least downtime you've ever experienced.

Precision stamping—a result of unusually rigid frames... extra long ram guides and slides that permit full use of the guiding area at the bottom of the stroke.

Send for full details on money-saving Kenco presses.

KENCO MANUFACTURING CO.

Mfrs. of Precision Machinery and Accessories.
5211-A TELEGRAPH ROAD, LOS ANGELES 22, CALIFORNIA

For more data circle 354 on Reader Service Card



**Potter and Brumfield
Three-Pole Relay**

*Now they call Joe a genius**



*

He's no Einstein—but he figured how to cut costs in half by switching to...

NEW T-J REAMERS with throw-away heads!

You don't have to be a wizard at figures to see how the new T-J Reamer with Throw-Away Head cuts your replacement costs to less than half. You save because you replace *only* the part that wears out. Buy original shank . . . change the head in a jiffy when worn. Wide range of head sizes from $\frac{1}{8}$ " to $2\frac{3}{8}$ " inclusive, in $1/16$ " increments available with right or left hand spiral flutes for thru or blind hole reaming.

Tapered hole in head insures concentricity and *new* thread design assures a snug fit on smoothly ground tapered shank. Reamer operates free from binding or sticking due to cutting portion wearing undersize and creating negative relief. It's a product of T-J's 39 years of know-how as one of the largest manufacturers of die sinking milling cutters. Tomkins-Johnson Co., 617 North Mechanic St., Jackson, Mich.

- 1—Cuts replacement cost to less than half!
- 2—Quick change of heads saves time.
- 3—Wide range of sizes.
- 4—Head and arbor firmly locked together.
- 5—Easy to change heads for different metals, increases efficiency.

For more data circle 355 on Reader Service Card



Left hand spiral,
right hand cut.

Right hand spiral,
right hand cut.

★ Exclusive, high potential territories open to responsible manufacturers representatives. Write today!

T-J

TOMKINS-JOHNSON

BRAKES AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHERS

MESSAGE from the "NO" men of Laminated Shim Company

You lose **NO** time when you use
LAMINUM SHIMS...

NO machining!



NO grinding!



NO counting!



NO stacking!



NO miking!



...and **NO** dirt between layers—ever!

LAMINATED SHIMS OF



STAINLESS STEEL with laminations of .002" or .003"	LOW CARBON STEEL with laminations of .002" or .003"
---	--

BRASS with laminations of .002" or .003"	ALUMINUM with laminations of .003" only
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LAMINATED SHIM COMPANY, INC.

Shim Headquarters since 1913

3301 Union Street, Glenbrook, Conn.

For more data circle 356 on Reader Service Card

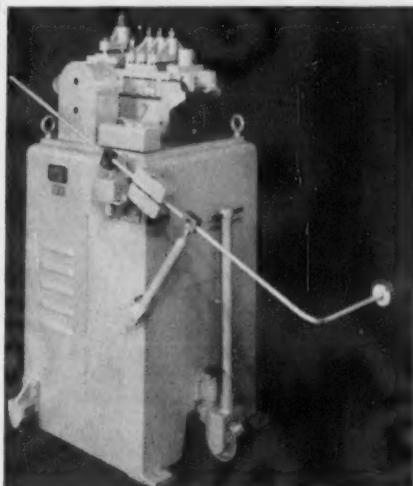
212 modern machine shop

new shop equipment . . .

Straightener is POWER DRIVEN

The U. S. Tool Co., Inc., Ampere (East Orange), N. J., recently introduced the Model PDS-4½ Power Driven Straightener to its line of automatic pressroom equipment. This machine has a capacity for material up to 4½ inches wide by $\frac{1}{8}$ inch thick. This straightener is equipped with a pair of power driven take-in rolls and six straightening rolls, the upper three of which are individually adjustable and the lower three are power driven. The assembly of this unit is of hinged construction, so that it can be opened for easy threading of the end of a new coil. It is furnished with forward, stop and reverse controls, indicators on straightening rolls, casters for portability, micro switch loop control arrangement and $\frac{1}{2}$ h.p. variable speed drive motor.

For more data circle 86 on Reader Service Card



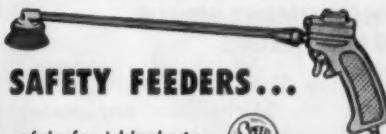
View of U. S. Model PDS-4½ Straightener

AIR OPERATED **LITTELL** units

- SAVE MONEY
- SAVE FINGERS
- SAVE HANDS
- SAVE TIME

...WITH dependable air operated safety units by Littell

Pres-Vac



SAFETY FEEDERS...

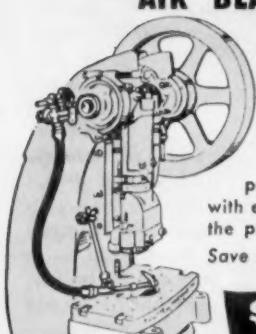
safely feed blanks to press from the safe distance of 14 inches
—BY AIR!

Save those fingers.

\$35.00



AIR BLAST VALVES...



eject parts safely with each stroke of the press—BY AIR!

Save those hands.

\$29.00

NEWEST **LITTELL** UNIT

SHEET LIFTERS..

handle sheets of steel glass, plywood, boxes, cabinets, etc. Safely—
Save those Insurance Premiums.

\$32.00



F.J.
LITTELL
MACHINE
CO.

AIR DIVISION

4163 RAVENSWOOD AVENUE
CHICAGO 13, ILLINOIS

District Offices: DETROIT and CLEVELAND

Write for FREE Catalog



**LITTELL Also Makes These
Punch Press Accessories**

- ROLL FEEDS
- REELS
- STRAIGHTENING MACHINES
- COIL HOOKS

For more data circle 357 on Reader Service Card

new shop equipment . . .

INSTRUMENT SPEEDS GAGE SETUPS

Orion Tool Co., 14560 Lesure, Detroit 27, Mich., has announced its "Inchmaster" master setting gage. This instrument is constructed of a stack of individual gage blocks, so arranged that portions of both the upper and

lower surfaces of each block are exposed for quick and easy setups. The blocks are of 1 inch thickness, so that the full inches are directly available on the instrument. Intermediate sizes are made up of standard gage blocks and placed upon and/or below the proper unit block to obtain the required dimension. According to the manufacturer, this portable unit is designed so that any combination of blocks within its range is safe.

Another one of the features of the "Inchmaster" is the advantage to toolmakers and inspectors in being able to setup a number of different dimensions, enabling them to check several tools, components and so on at the same time. The base construction is such that it is claimed to be impossible to topple the gage over.

For more data circle 87 on Reader Service Card



The Wells Roto-Veyor is an entirely new concept in automatic bar feeds. Designed specifically for use with the Wells Model 1200 Band Saw, the Roto-Veyor converts it into a heavy duty completely automatic cut-off machine.

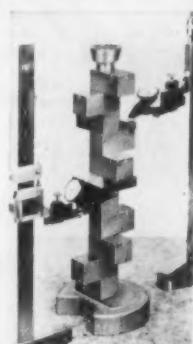
All conveyor feed rollers are mechanically powered—electrically controlled. The Roto-Veyor is capable of unlimited projection length. Feed mechanism and stock clamping action is synchronized with the saw to provide accurate repetitive cutting.

The Roto-Veyor will improve the saw's efficiency, save time, and reduce production cutting costs. Write today for complete information.



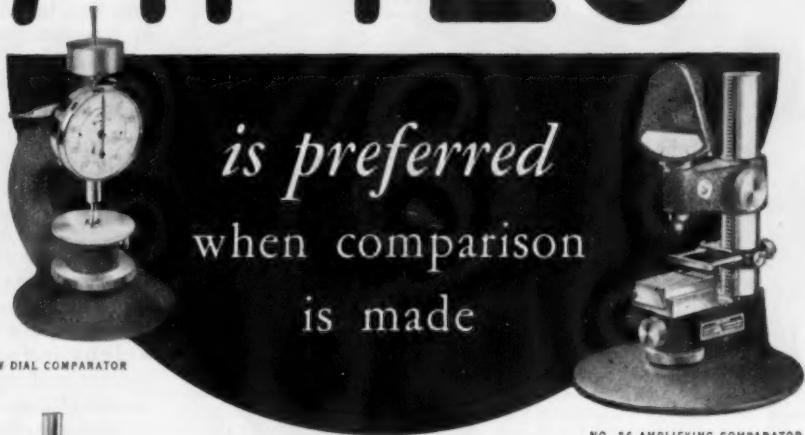
For more data circle 358 on Reader Service Card

The Pioneers of Horizontal
**METAL CUTTING
BAND SAWS**
WELLS MANUFACTURING CORPORATION
808 TYLER ST. • THREE RIVERS, MICH.



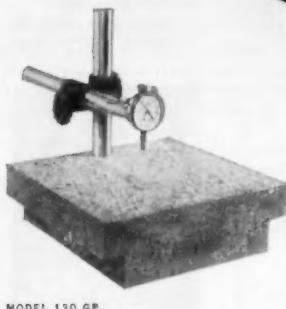
**Orion "Inchmaster"
Master Setting Gage**

AMES



NO. 2W DIAL COMPARATOR

NO. 26 AMPLIFYING COMPARATOR



MODEL 130 GP.

For fast, accurate measurements, Ames Dial Comparators are the choice of quality control men everywhere. You get definite, impersonal readings directly from the dial. There's no guesswork or figuring.

Special comparators are available for measuring resilient materials such as rubber, paper, etc., and for measuring non-yielding materials such as sheet metal, glass and plastic. Write for complete details.

Representatives in principal cities



B.C. AMES CO.

29 Ames Street, Waltham 54, Mass.

MANUFACTURERS OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS
For more data circle 359 on Reader Service Card

January, 1957

modern machine shop 215

new shop equipment . . .

SURFACE GRINDER FEATURES OPERATIONAL EASE

Harig Manufacturing Corp., 5765 West Howard St., Chicago 31, Ill., recently acquired manufacturing rights on the TML Surface Grinder. An improved version of the TML Hand Feed Surface Grinder has gone into production. This grinder features im-

proved accuracy, design and operational ease. According to the manufacturer, this machine has faster longitudinal travel per revolution of the hand wheel; new design accommodates standard wheel adapters; transverse travel is 7 inches and working height under a standard 7 inch diameter wheel is $12\frac{1}{4}$; the grinder is supplied with prepacked spindle bearings for long life, clean operation, accuracy and the elimination of spindle lubrication. Power is supplied by $\frac{1}{2}$ or $\frac{3}{4}$ h.p. motors.

A cabinet of sturdy construction features a hinged door, inside shelf storage and is provided with floor levelers. The machine is available without the cabinet for use as a bench model. Total weight including cabinet and motor is 550 pounds.

For more data circle 88 on Reader Service Card



The lapped finish on the hard knurling surface of the knurl contributes to outstanding performance and longer life.

Over 100 styles and sizes in stock.
Special knurls to your specifications.

REED ROLLED THREAD DIE CO.

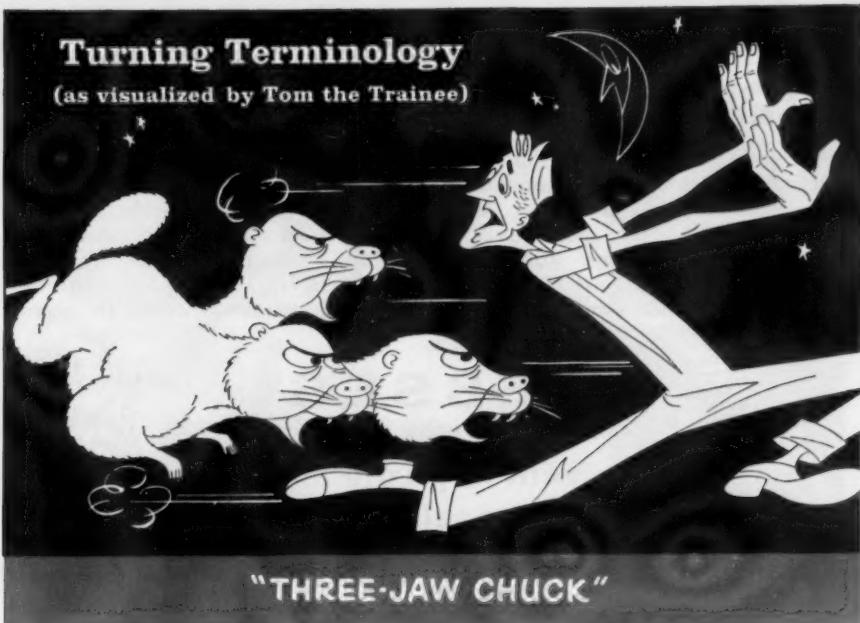
Thread Rolling Machines and Dies, Thread Rolling Attachments,
Thread Rolls and Knurls for Automatic Screw Machines and Turret Lathes
WORCESTER, MASSACHUSETTS, U. S. A.

For more data circle 360 on Reader Service Card



Harig Surface Grinder

Turning Terminology (as visualized by Tom the Trainee)



"THREE-JAW CHUCK"

Tom will stop running like a scared jack-rabbit and become a "jack-of-all-trades" when he masters all the accessories available with LeBlond Regal lathes. All the chucks, stops and rests that make jobs easier.

Take LeBlond's exclusive Hydra-Trace duplicating attachment. Duplicates any contour from a flat, easy-to-make template. Performs facing, turning or stepless form turning operations. Simple to set up, simple to run.

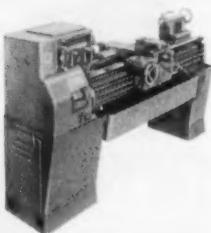
Then there's the taper attachment. Set it up and leave it installed — doesn't affect normal lathe operation. Cut tapers without disengaging the cross feed screw.

The Regal is designed for grinding attachments, milling converters, milling and keyway vises, turrets and many other accessories. A fully equipped Regal practically gives you a one-machine machine shop.

Many of LeBlond's big lathe features are found in the Regal. The industry-proven gear-belt headstock drive with 12 speeds, hardened and ground replaceable steel ways using compensating vee-way principle, sturdy one-piece apron, both feed rod and leadscrew and the automatically lubricated quick-change box providing 56 feeds or threads.

Regal lathes are available in 13", 15", 17", 19", 21", 24" sizes. Also a 13" bench model.

WRITE FOR BULLETIN R-201-T



The R. K. LeBlond Machine Tool Company

Cincinnati 8, Ohio
World's Largest Builder of a Complete Line
of Lathes for More than 70 Years



For more data circle 361 on Reader Service Card

new shop equipment . . .

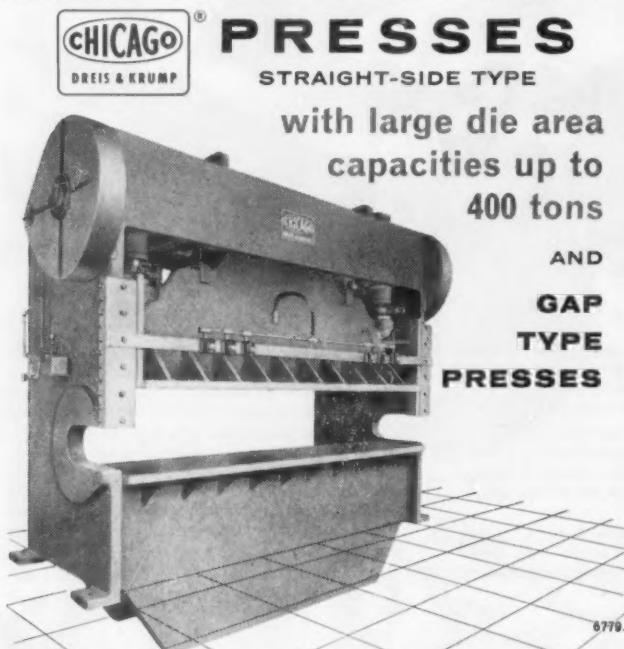
PORTABLE SHEET STEEL RACKS

Palmer-Shile Co., 16022 Fullerton, Detroit 27, Mich., recently announced its portable heavy-duty sheet steel racks, which have been engineered to conveniently handle and store sheet steel. An important feature of the flush bottom racks is the reinforced cross-

bars welded to the frame, thereby permitting the sheet steel stock to nest snugly. This is said to eliminate sagging and to make carrying, tiering and storing simple and safe. Sheet steel of various widths can be handled and tiered to desired height. Each individual rack is easily accessible. The racks are designed to save floor space, while permitting storage of more stock tonnage. The racks are picked up with automatic tongs suspended from overhead cranes.

An extra thickness of lift bar is welded to the full wrap around crane bar for additional strength and safety. Safety strips are welded at each end of the rack to prevent the rack from slipping when tiered. These racks are built to any size and weight specifications desired.

For more data circle 89 on Reader Service Card



Complete recommendations for any job on request



Press Brakes • Straight-Side-Type Presses • Press Brake Dies

Hand and Power Bending Brakes • Special Metal-Forming Machines

**DREIS & KRUMP
MANUFACTURING CO.**

7418 South Loomis Boulevard, Chicago 36, Illinois

For more data circle 362 on Reader Service Card

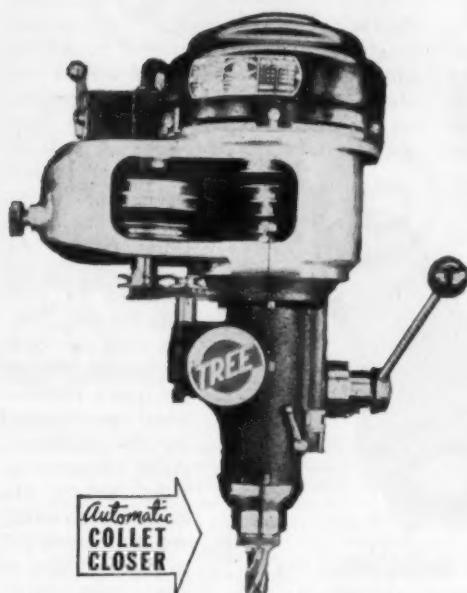
218 modern machine shop



Palmer-Shile Heavy-Duty Sheet Steel Racks

January, 1957

do you need . . . VERTICAL MILLING CAPACITY?



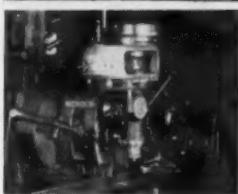
Automatic
COLLET
CLOSER

You can add vertical milling capacity by adapting the versatile TREE MH-4 Vertical Milling Attachment to your present horizontal milling machine. The MH-4 gives you all angle milling, drilling and boring with a high degree of accuracy because of its built-in rigidity. Spindle — alloy steel, hardened and ground. Roller drive eliminates back-lash. Quill — 4 inch travel. Enclosed micrometer depth stop. Power feed. Write today for full information.

Cincinnati



Nichols



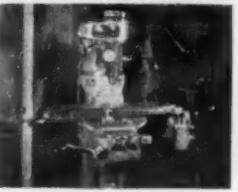
Kempsmith



Milwaukee



Bridgeport



EXPORT ADDRESS: States Trading Co., 401 Brdwy., New York 13, Cable Address: "STRADESO"

TREE TOOL AND DIE WORKS
1600 JUNCTION AVENUE RACINE, WISCONSIN

For more data circle 363 on Reader Service Card

new shop equipment . . .

STANDARD STAGGERED TOOTH SLOTTING CUTTERS FOR LIGHT METAL ALLOYS

A complete series of standard flat-faced-blade staggered tooth slotting cutters for use on aluminum and its alloys and other light metals is now available from Goddard and Goddard

Co., Detroit 23, Mich. Standard in 102 sizes, the WAD Series provides cutters ranging from $\frac{1}{8}$ inch to 2 inches wide, and diameter from 4 inches to and including 16 inches.

These cutters provide maximum flexibility in meeting the various cutting conditions encountered in milling aluminum and other light metals and their alloys. Two keyways are provided on all cutter bodies; one to stagger teeth when interlocking cutters, the other to line up teeth when straddle milling these parts. All chip spaces are polished to provide for free-flowing chip disposal.

Cutter blades for quick replacement are stocked by the company. Axial blade serrations allow the blade to be easily set out for width maintenance or for slight variation in width of slot to be milled. Blades are securely anchored in the cutter body by wedges.

For more data circle 90 on Reader Service Card

IMPROVED TYPE HOLDERS for stamping into Metal, etc.



Hand or Press Style. Type can be easily, quickly loaded and unloaded. Simplest construction . . . just a sturdy pin holds the type securely. No screws nor springs. Super-quality steel type made in various sizes: $1/32$ " up to $1/2$ " figures and letters. Write for Bulletin MS23H.

DETAIL CHASE and PUNCH FOR QUICK STAMPING OF NAMEPLATES



Model 24

An ingenious tool for rapid stamping of plain, etched or embossed name plates. Used in a small Kick or Power Press, or in our No. 93 or No. 131 Bench Press. Steel Type and Logo Type are dropped into recess. Logo Type are used for numerical and letter combinations.

All lines are stamped in one operation, making tool very efficient. Small, as well as large lots can be stamped economically, neatly. Write for Bulletin MS-24.

NUMBERALL STAMP & TOOL CO. HUGUENOT PARK STATEN ISLAND 12, N. Y.

For more data circle 364 on Reader Service Card

220 modern machine shop



Goddard & Goddard
WAD Slitting Cutter

January, 1957

NEW



ALL-ANGLE ELECTRIC SCREWDRIVER

Here is really an amazing tool. It will do everything the conventional designs will do, and much more. It will work in extremely close quarters where there wouldn't be clearance for the others.

It will drive, set and remove wood screws, self tapping screws, lag screws, and machine screws and nuts. An optional adjustable clutch may be set to provide uniform tightness, or the operator can control tightness with hand pressure. Available bits include Standard Screw Driver, Phillips, and Socket Wrenches.

It will deliver the long, trouble-free Service everyone expects of a SIOUX Tool. Look for SIOUX under "Electric Tools" in the yellow pages.



Cuts the time in half in Auto Body work



Speeds the Factory Assembly Line



A Natural for Duct Work
Inside or outside



For the Building and
Woodworking trades



ALBERTSON & CO., INC.

SIOUX CITY, IOWA, U.S.A.

ELECTRIC DRILLS * SANDERS * GRINDERS * IMPACT WRENCHES * POLISHERS
* PORTABLE SAWS * FLEXIBLE SHAFTS * VALVE FACE GRINDING MACHINES
* ABRASIVE DISCS

For more data circle 365 on Reader Service Card

new shop equipment . . .

CONVERTIBLE SELF-OPENING DIE HEAD

The Geometric Tool Co., Division of Greenfield Tap and Die Corp., New Haven 15, Conn., recently announced its Model "DSA" Die Head. This convertible self-opening die head with aligning shank is primarily for use on

Brown and Sharpe and other small screw machines of either the automatic or hand type. The "DSA" is equipped with both an outside trip for short length, fine pitch shoulder threading and a pull-off trip for longer threads, providing ample chaser engagement for tripping. Conversion from one trip to the other is said to be quick and simple.

According to the manufacturer, the following are features of the "DSA"

construction and operation: ease of assembly and disassembly; improved driving construction for free and smooth operation; improved locking bolt and segment providing long wear life; tongue and groove drive between cam spring plate and skeleton; rugged construction of small parts — new and heavier stop plunger, larger adjusting screws (hollow hex), heavier tripping mechanism, larger cam spring plate screws — without increase in size or



Slotting typewriter type bar segment.

Solve problems in high-precision slitting, slotting, sawing with Gay-Lee carbide-tipped Thinsaw! Wafer-thin for the most delicate work with positive alignment and rigidity that avoid run-out . . . but retaining the speed and long life of carbide. Patented construction holds tips firmly.

- **THIN AS .030"**
- **DIAMETERS UP TO 12"**

Complete Line of Saws for Any Application—To Any Tolerance

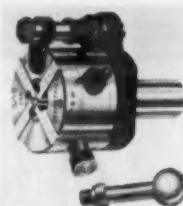


WRITE FOR FULL INFORMATION

GAY-LEE
COMPANY

CLAWSON • MICHIGAN

For more data circle 366 on Reader Service Card

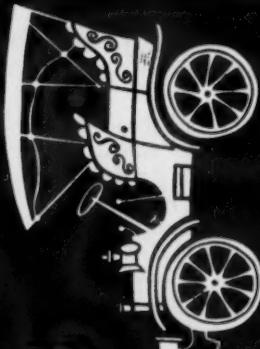


Geometric Die Head

HOW

ANTIQUES

ARE YOUR
MICRO-
MACHINING
METHODS?



The Levin micro-drilling equipment shown here can be used with the smallest drills available. It is designed so that the drilling does not depend on the operator's sense of feel. The drill can be retracted for chip removal and returned to the drilling position without striking the bottom of the hole. While commercial drills can be had as small as .0016" this micro-drilling apparatus has successfully produced holes as small as .0006".

DRILL MICRO-HOLES

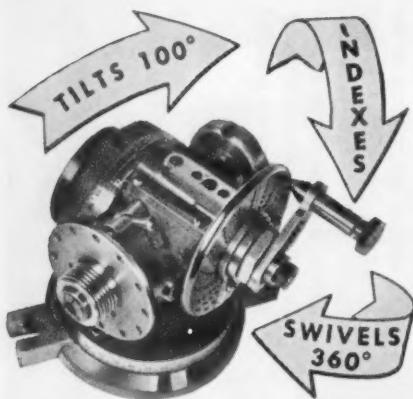
DOWN TO .0016" with SPEED & ACCURACY

Send for Catalog M describing complete line of instrument lathes and accessories.

ON LEVIN® INSTRUMENT LATHES

LOUIS LEVIN & SON, INC.—3610 S. BROADWAY—LOS ANGELES 7, CALIFORNIA

For more data circle 367 on Reader Service Card



FOR FASTER PRODUCTION

THE ELLIS DIVIDING HEAD

Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions—swiveling in two planes—will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

N
NICHOLS MORRIS
M
CORPORATION

76-H MAMARONECK AVE.

WHITE PLAINS, N. Y.

For more data circle 368 on Reader Service Card

224 modern machine shop

new shop equipment . . .

weight of the die head; flattened construction of backpart and shank (permitting the die head to be installed as close to the turret as possible without interference); better interchangeability of parts; present DS chasers interchangeable in "DSA" Model.

For more data circle 91 on Reader Service Card

★ ★ ★

LIGHTS AVAILABLE WITH PEDESTAL OR UNIVERSAL BASE

The Fostoria Pressed Steel Corp., Fostoria, Ohio, has announced that its Localites are now available in two new models. Model 8-F28M-705 has a pedestal base for bench, table or desk mounting to provide instantly adjustable lighting of assembly, inspection, laboratory and other operations. Model 55-F28M-701 has a universal base for mounting on machine tools and equipment to light precision work areas. Both models are equipped with frictional disc and collar joints for flexibility to instantly direct light exactly as wanted. These lights are designed to provide cool, efficient fluorescent lighting with two T5, 8W, 120 volt, 60 cycle tubes.

For more data circle 92 on Reader Service Card

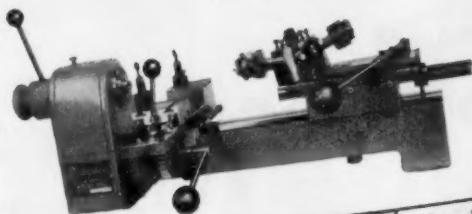


View of Fostoria Localite Lighting Units

January, 1957

Derbyshire

*fine
precision
equipment*

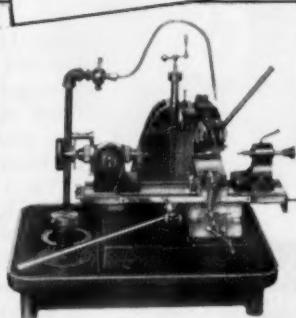


MODEL No. 750

BED 22"

CENTER HEIGHT - 7.50 CM

COLLET CAPACITY - .315"



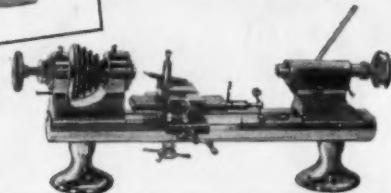
MICROMILL

2 TABLE SURFACES:

7 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ "

12" x 2 $\frac{1}{2}$ "

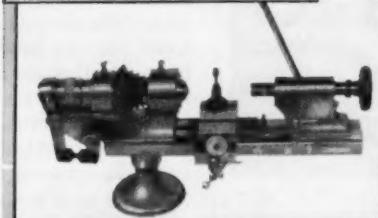
TAKES
MAGNUS
COLLETS



ELECT LATHE - 18" BED

CENTER HEIGHT - 2.35" (6 CM)

CHUCK CAPACITY - .004" to .315"



MAGNUS LATHE - 12" BED

CENTER HEIGHT - 5 CM

COLLET CAPACITY - .315"



WEBSTER WHITCOMB

BED 12"

CENTER HEIGHT - 5 CM

COLLET CAPACITY - .1969"

F. W. DERBYSHIRE, INC.

157 HIGH ST.

WALTHAM

MASS.

Write for full details

For more data circle 369 on Reader Service Card

new shop equipment . . .

WIPING TOWEL DISPENSER SAVES TIME

A machine, designed to dispense Texel Shop Towels in bundles of five or ten, one bundle at a time as required, has been announced by Industrial Wiping Cloth Co., Inc., 29-28 Forty-First Ave., Long Island City 1,

N. Y. The Texel Service Y-Ping Tool Dispenser is designed to minimize loss and pilferage of shop towels and necessitates handling of nothing but towels by the workers. The dispenser holds 1,000 clean towels in bundles of five or ten, as may be desired. The bottom of the machine holds as many as 1,000 dirty towels. The dispenser mechanism is actuated when soiled towels are thrown into the machine in an amount equivalent to the number in each clean bundle. The soiled towels strike a lever, which trips a counter. After five (or ten) counts are made, the machine automatically delivers a bundle of clean towels.

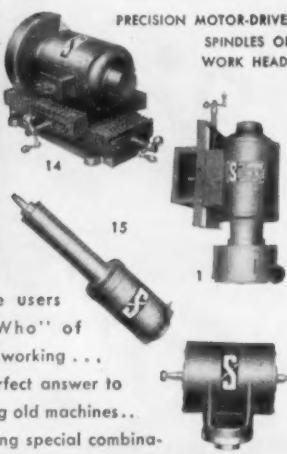
According to the manufacturer, many advantages are attributed to use of the machine. It is claimed to make it easy for plants to replace inefficient rags with towels specifically designed and manufactured for shop use. Moreover, towel use can now be controlled easily with the dispensing machine, and distribution is more convenient and less time consuming. The dispenser can be placed in convenient loca-

STANDARD has a spindle for every purpose!



STANDARD spindle users
are a "Who's Who" of
American metal working . . .
here's the perfect answer to
modernizing old machines . . .
developing special combina-
tions with regular spindles.

PRECISION MOTOR-DRIVEN SPINDLES OR WORK HEADS



★ DYNAMICALLY BALANCED ★ PRECISION ENGINEERED ★ EXTRA HEAVY DUTY SPECIAL PROBLEMS?

Tell us about them . . . WE'LL
DESIGN A SPINDLE FOR YOU
. . . we take great pride in our
reputation for custom engineer-
ing in the spindle field.

WRITE FOR LITERATURE TODAY!

Since 1912

the STANDARD electrical tool co.

PRECISION SPINDLES AND MACHINE TOOLS

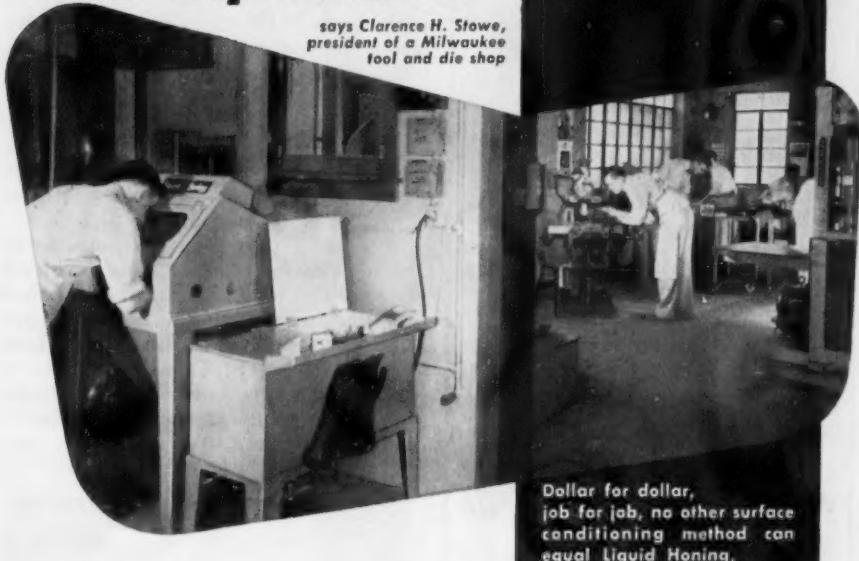
2487 RIVER ROAD • CINCINNATI 4, • OHIO

For more data circle 370 on Reader Service Card



"Liquid Honing* pays for itself 5 times faster than it depreciates!"

says Clarence H. Stowe,
president of a Milwaukee
tool and die shop



Dollar for dollar,
job for job, no other surface
conditioning method can
equal Liquid Honing.

"Our Liquid Honing machine," Mr. Stowe continues, "enables us to remove heat-treat scale instead of waiting for the heat treater to do it. Consequently, customers get faster job deliveries.

"In only one-fourth usual time, Liquid Honing cleans molds for repairs or remodeling — and ends what used to be a difficult, tedious hand operation.

"Many die casting and plastic molds now go out with an oil-retaining Liquid Honed satin finish that eliminates hand polishing after final heat treating.

"In addition, we clean hand tools, spare machine parts, cutting tools, electrical contacts — anything small enough to go into our machine. So it's easy to understand why Liquid Honing will pay for itself within a year — *five times faster than it depreciates!*"

That's the Stowe story—a "preview" of a few of many advantages Liquid Honing can bring to your tool room, machine shop or die department. You'll be surprised at the low cost — only \$550 to \$1500 for a standard machine.

Write for details or send a sample part for free demonstration processing.

*Vapor Blast and
Liquid Honing
are trademarks.



**VAPOR BLAST MFG. CO. 3013 W. Atkinson Ave.
Milwaukee 16, Wisconsin**

For more data circle 371 on Reader Service Card

new shop equipment . . .

DEPENDABLE ACCURACY



INSPECTION TOOLS made of MEEHANITE METAL are designed to fill your various Inspection and Checking needs. Sturdily constructed to give you reliable, accurate service.

Surface Plates — Box Parallels

Slotted Angle Plates

Universal Right Angles

Flat Parallels — Lapping Plates

Toolmakers' Knees — "V" Blocks

Straight Edges (Bridge Type)

Straight Edges (Leveling Type)

Measuring Irons

Masterangle Plates

Angle Attachments

Surface Plates Rescraped

Send for Bulletin

ACME TOOL CO.

73 W. Broadway New York 7, N. Y.

For more data circle 372 on Reader Service Card

228 modern machine shop

tions in the plant, closer to the worker and his machine, saving steps he formerly spent in walking to and from the tool crib every time a new towel was needed. He now also receives as many as five or ten at one time. Installation of a dispenser also saves time for the tool crib attendant, since he is no longer bothered with the distribution and control of shop towels. Even delivery of towels to the plant becomes more simple. An exact number of bundles can be deposited each time.

Counting device on the dispenser makes possible efficient control of all towels. The chute for soiled towels has "traps" in it so that once towels are thrown inside, it is impossible for them to be withdrawn. Traps are made to control the types of material activating the machine preventing any products other than towels, which may



View of Texel Service Y-Ping Tool Dispenser

January, 1957

grinding and fitting

DIFFICULT CONTOURS

is EASY, with
BOYAR-SCHULTZ
Profile Grinders



BOYAR-SCHULTZ Profile Grinders have long been basic tools in Tool & Die Shops where daily operations require grinding and fitting odd shapes and irregular contours.

Work of this kind CAN be performed without a Boyar-Schultz Profile Grinder — but only at the cost of long hours of tedious hand work.

Spindle speeds of 10,000 and 20,000 R.P.M. afford rapid stock removal even with wheels of small diameter. WHEEL CAPACITIES: No. 1 Bench Model, $\frac{1}{8}$ " to 1" (20,000 R.P.M.). No. 2 Model with Single or Dual Spindle, $\frac{1}{4}$ " to 3" (10,000 R.P.M.). Write for complete description.



BOYAR-SCHULTZ
CORPORATION

2020 South 25th Avenue
Department AJ Broadview, Illinois

For more data circle 373 on Reader Service Card

new shop equipment . . .

have been thrown in accidentally, from tripping the counter.

The exterior and interior of the Texel Service Y-Ping Tool Dispenser is a sanitary "cleanliness white." For more data circle 93 on Reader Service Card

GAGE MEASURES HEIGHT UP TO 61 INCHES

An optical height gage, said to permit fast measurements of heights up to 61 inches with accuracies of plus or minus 0.000005 inch per inch of height, has been announced by Webber Gage Co., 12899 Triskett Rd., Cleveland 11, Ohio. Known as the Micro-Accurate Optical Height Gage, this measuring instrument is said to combine Webber Gage Blocks and the Leitz Measuring Microscope to give speedy, easy, accurate surface plate transfer of measurements.

The manufacturer describes the unit as basically a stack of gage blocks which are held by spring tension to the known accuracy of plus or minus 0.000005 inch per inch of height. The stack, which is made up of alternating 0.300 and 0.700 inch blocks, is divided into one inch measurements by the protrusion of the 0.300 inch blocks beyond the 0.700 inch blocks.

By means of a lever-operated cam and a vernier adjustment hand wheel, the stack of blocks is easily raised and lowered over a range of one inch to obtain fast settings of measurements to 0.000025 inch. These are read in the Leitz optical eyepiece and are measured from the top of the protruding gage block corresponding to the inch of height being measured. According to the manufacturer, measurements are easily and quickly transferred from

REID

TOOL ROOM ACCESSORIES

CONTROL BALL HANDLES

Round Plastic Oval Plastic
Round Steel Mushroom Plastic

FREE
New 64 Pg.
CAT.

Round and oval plastic handles are supplied in red or black as wanted. Scores of other needed tool room items available.

REID TOOL SUPPLY CO.
MUSKEGON HEIGHTS, MICHIGAN

For more data circle 374 on Reader Service Card

LEAK PROOF AIR GUN

Precision made of Bar Brass and Stainless Steel

Patented

No packing gland — no external levers or buttons. Easy to use. Unequalled for long service, dependability and low maintenance. Order sample on approval.

AIR-WAY PUMP & EQUIP. CO. 1046 N. Kilbourn Chicago 51, Illinois

For more data circle 375 on Reader Service Card



**"The Sky's The Limit"
when it comes to profitable uses
for MAGNA-LOCK CHUCKS**

Your investment in a Magna-Lock electro-magnetic chuck is an investment in *versatility* which pays real dividends many times over. In addition to normal surface grinding operations, users are constantly finding new and practical applications of the *extra holding power* of Magna-Lock Chucks for jobs such as these:



MILLING OPERATION

66% reduction in setup time
for milling cast iron gibs at
Turchan Follower Machine Co.



TRANSFERRING PARTS

loading and unloading wa-
ter heater shells at Perma-
glas Div., A. O. Smith Corp.



HAND FILING

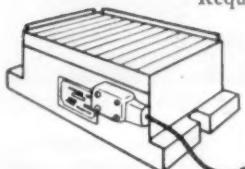
as well as layout, fixture
work and similar jobs are
done faster, more easily.

Your jobs, too, can be done faster, at less cost through the 22% *extra holding power* of Magna-Lock Chucks—all steel, moisture-proof, shock-proof. Rectangular chucks from 5" x 10" to 30" x 96" working surfaces—rotary chucks from 6½" diameter face to 72" diameter—swiveling chucks from 5" x 10" to 12" x 84".

Take advantage of Magna-Lock versatility. Our engineers will be glad to work with you on your idea or problem.

WRITE DEPT. MM-17

Request Magna-Lock as *original equipment* on your new machines.



**Hanchett MAGNA-LOCK
CORPORATION**

BIG RAPIDS, MICHIGAN, U. S. A.

designers and makers of a complete line of magnetic chucks and devices.

For more data circle 376 on Reader Service Card

new shop equipment . . .

this point to the work or vice versa.

According to the manufacturer, this optical height gage eliminates slow, tedious wringing together of many gage blocks to obtain long measurements, with resultant uncertain accuracies. It is also claimed to eliminate the inaccuracies of micrometer screws.

Because gage blocks in the Webber Height Gage are never handled, measurements, according to the manufacturer, are always at known room temperature.

The instrument is said to contain no parts which can wear and, therefore, to require no servicing. Accuracy always remains the same. The base is a heavy Meehanite casting, firmly supported on three hardened, ground and lapped feet which slide smoothly on the surface plate. The optical system is well protected within the base, and gage blocks are supported in rugged cast iron and aluminum standards.

The Webber Micro - Accurate Optical Height Gage is available in four models, measuring to heights of 25, 37, 49 and 61 inches, respectively.

For more data circle 94 on Reader Service Card

NEW BALANCED CUTTING ACTION

Severance

ECARNO-MILLS

THE ECONOMY MILL NEW DESIGN NEW CARBIDE

IN PORTABLE TOOLS

IN MACHINE TOOLS

22 Shapes and Sizes Available

A NEW LOW PRICED HIGH CLASS PERFORMER

Made by the originator of ground-from-the-solid Rotary Files, and pioneer in this type of Carbide Mill, who presently offer the largest range of standard types, shapes, and sizes.

OPERATE EFFICIENTLY AT USUAL CARBIDE SPEEDS, YET PERFORM BEAUTIFULLY AT THE SLOWER SPEEDS OF STEEL CUTTERS

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Ask for a Severance catalog today!

For more data circle 377 on Reader Service Card



Webber Micro-Accurate Height Gage

TREET-ALL

the
HEVI DUTY
Multi Purpose
FURNACE
for
TOOL ROOM AND
EXPERIMENTAL HEAT TREATING

With a maximum temperature of 1850° F., the TREET-ALL can easily handle your scale free hardening, carburizing, dry cyaniding and silver brazing.

The alloy muffle and gasketed door form a tight seal which simplifies atmosphere control. The furnace, quench tank, cabinet and controls form a compact, completely wired unit.

Write for Bulletin HD-1147-BB



HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES **HEVI DUTY** ELECTRIC EXCLUSIVELY
DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

MILWAUKEE 1, WISCONSIN

For more data circle 378 on Reader Service Card

new shop equipment . . .

PANTOGRAPH RATIO AND CUTTER SELECTOR FOR ENGRAVERS

H. P. Preis Engraving Machine Co., 249 Industrial Branch, Hillside, N. J., has announced its Pantograph Ratio



Preis Pantograph Ratio and Cutter Selector

GRANT RIVETERS

• Pioneers in the riveting field. Head rivets from smallest to $\frac{3}{4}$ " diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 5, Conn.

For more data circle 379 on Reader Service Card

and Cutter Selector Chart. This pocket calculator has been prepared to assist engraving machine users to quickly find the correct pantograph ratio and the proper width of cutter when engraving letters with a specified overall height from single line master copy type. It measures 3 by 7 inches and covers a range of seven sizes of master copy type from $\frac{3}{8}$ inch to 3 inches high for engraving 34 sizes of letters ranging in size from $1/16$ inch to $3\frac{1}{2}$ inches high with a choice of bold, medium, light or extra light strokes.

According to the manufacturer, this selector eliminates tedious computations, prevents costly errors on engravings where accuracy and close tolerances are required and assures accurate duplication on repeat orders. It is made of durable plastic to endure

INCREASE PRODUCTION . . . CUT TURNING COSTS

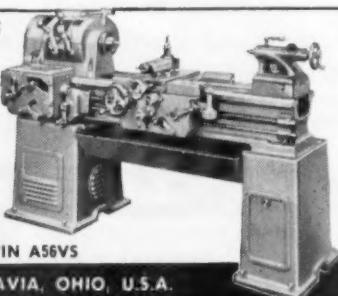
NEW C & J 16" GEARED HEAD ENGINE LATHE MODEL GH

- Speeds to 600 rpm
- 12 geared spindle speeds provide enormous pulling power
 - Choice of threaded or taper key drive spindle nose
 - Heavy duty precision Timken taper bearings on spindle
 - WRITE FOR BULLETIN A56GH

ALSO NEW 16" VARIABLE SPEED ENGINE AND TOOL ROOM LATHE MODEL VS

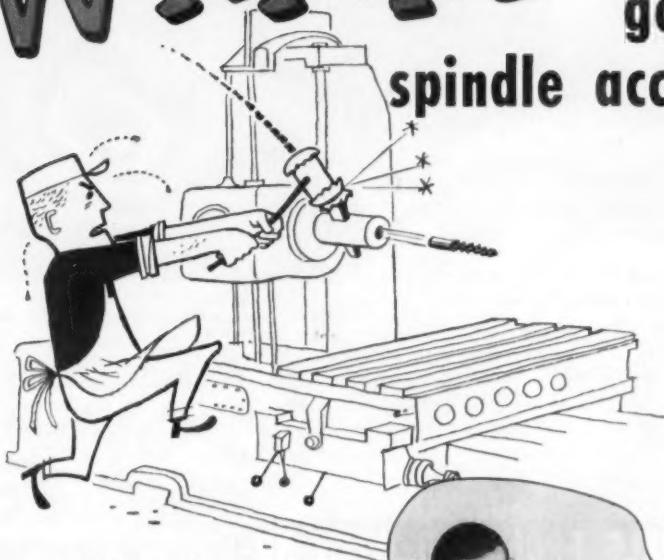
WRITE FOR BULLETIN A56VS

Carroll - Jamieson Machine Tool Co. BATAVIA, OHIO, U.S.A.

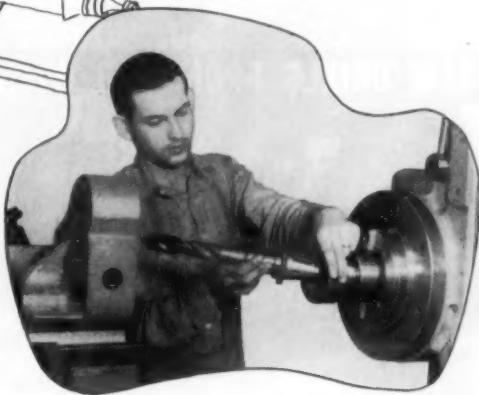


For more data circle 380 on Reader Service Card

WHAM and there goes spindle accuracy



Our illustrated "character" is about to ruin spindle accuracy with a hammer and drift key that cost a lot of money to get in the first place. Modern P.D.Q. tooling can eliminate this abuse . . . and save time and money as well. A quick one-sixth turn of the holder nut releases the adapter and you're ready for the next operation . . . it's as easy as that. How about those machine tools in *your* plant? Get the facts on P.D.Q. tooling . . . Write for complete information.



Representatives in principal cities.



PORTAGE Double-Quick, Inc.

1041 SWEITZER AVENUE • AKRON 11, OHIO

For more data circle 381 on Reader Service Card

new shop equipment . . .

constant handling, and instructions for use are printed on the plastic for easy reference.

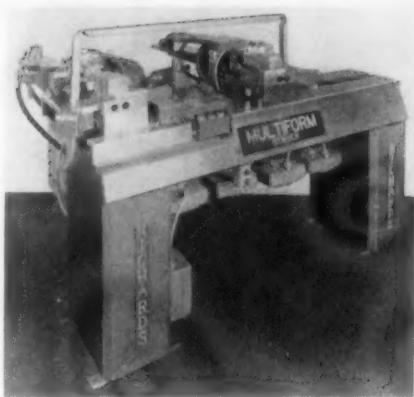
For more data circle 95 on Reader Service Card

★ ★ ★

HYDRAULIC BENDER FOR PRODUCING MULTI- ANGLED CHANNELS

J. A. Richards Co., Dept. 6-M, Kalamazoo, Mich., has introduced a massive hydraulic machine for producing multi-angled channels in widths from two to six feet. The machine is operated by a 10 horsepower motor and has an automatic production cycle of 15 seconds.

Pushbutton controlled, the Multi-



Richards Multiform Big Brother Bender

form Big Brother Double End Bending Machine can be equipped for double end bending of practically any kind or shape of material.

For more data circle 96 on Reader Service Card

NEW DRILLS FROM OLD WITH NU-TANGS



We return
them like
this!

Send them
to us like
this!

Send us your old drills—we'll make them new again at a fraction of the cost of a new drill! Exclusive NU-TANG® process replaces twisted or broken tangs with brand new tangs of correct size—and with GUARANTEED ORIGINAL STRENGTH. No welding—No distortion—No shortening of drills—No sleeves.

Any drill, reamer, or other tool with a Morse taper in sizes 2 to 6 can be repaired perfectly this quick new way. Delivery—One week. Used by many leading industrial plants. Amazingly low cost—satisfaction guaranteed! Send for complete information.

* Patent No. 2,512,033

NU-TANGS INC. 1335 Bates Street
Cincinnati 25, Ohio

For more data circle 382 on Reader Service Card

*write
today*

PUTTING THE PRESSURE ON PRE-FAB BUILDING PANELS



MODEL AO-1200

at C. J. Glasgow—Detroit

When Lapeer air clamps replaced hand-operated clamps at C. J. Glasgow Co., Detroit, production of prefabricated building panels jumped 75%! In addition, rejects nose dived and quality control soared to a new high.

Sheets of galvanized steel are bonded to hot rolled formed steel channels (see illustration). Lapeer air clamps provide 100 p.s.i. around the jig.

This is just one more example of Lapeer clamps as used in industry. Automotive applications—in farm equipment—in metal working plants—all prove that Lapeer can put the pressure on!

Manufacturers of over 150 models of manually and air-operated clamps and pliers

Write
for
catalog
today!



**KNU-VISE
PRODUCTS**

LAPEER MANUFACTURING CO.

3048 DAVISON ROAD

WESTERN DIVISION: 422 Magnolia, Glendale, California • CANADIAN DIVISION: Higginson Engr., Hamilton, Ontario

For more data circle 363 on Reader Service Card

January, 1957

modern machine shop 237

new shop equipment . . .

TOOLHOLDER FOR INDEXABLE TYPE INSERTS

Diamonite Products Manufacturing Co., Canton 2, Ohio, is now offering a clamping type toolholder especially designed for use with oxide tools of

the indexable lozenge type and which, it is claimed, affords increased cutting efficiency and assures satisfactory tool performance under all conditions.

The body of the holder is precision machined of high carbon steel, heat-treated to provide high strength and rigidity. The clamp is also precision machined and heat-treated and is designed to provide uniform clamping pressure over the entire length of the separate, removable chip breaker, thus insuring maximum rigidity of the tool. A concealed hexagonal socket type adjusting screw works against the clamping screw to permit micrometer adjustment of the chip breaker for efficient cutting of various materials, while a raised shoulder on the underside of the clamp provides backing for the chip breaker, keeping its lead edge parallel with the cutting edge of the tool. A second raised shoulder on the underside of the clamp fits into a matching groove in the face of the holder body to keep the clamp in correct alignment at all times. A triangular heel on this shoulder bears on the bottom surface of the groove in the holder, acting as a rocker to permit the clamp to adjust itself to bear evenly over the full length of the chip breaker, thus compensating for variations in thickness of the shim or chip breaker.

A leaf spring under the clamp raises it when clamping pressure is released

BIO-GRANITE SURFACE PLATES



SIZES 9" X 12"
TO 60" X 120"

ACCURACY GUARANTEED
.00005 ON SIZES UP TO
24" X 36"

NON-MAGNETIC
CORROSION PROOF
WARP-FREE
NON-ABRASIVE
TEMPERATURE
RESISTANT

Made of genuine fine-grained Biotite
Granite

Write for Circular and Prices
Some Dealer Territories Open

**BENJAMIN HOROWITZ
MONUMENT WORKS, INC.**
33 SECOND AVE., NEW YORK 3, N. Y.

For more data circle 384 on Reader Service Card



Rowbottom for Cams

Specialized Production, Lower Costs
Send us your drawings or specifications . . . ask for
estimates on producing your cams on a contract basis.
You'll be interested . . . in our speed and savings.

THE ROWBOTTOM MACHINE CO.
WATERBURY, CONNECTICUT
Also Cam Milling and Cam Grinding Machines.
Details on request.

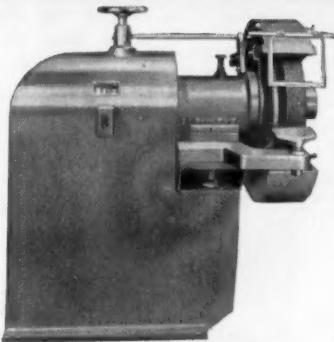
For more data circle 385 on Reader Service Card

America's Outstanding Grinders!

Maximum performance . . . production . . . economy . . . quality . . . speed . . . with minimum cost of operation and maintenance



UNITED STATES ELECTRICAL TOOL COMPANY GRINDERS for every purpose . . . for every industry



NOW NEW! SINGLE END VARI-SPEED
SNAGGING GRINDER 7½ TO 20 HP
MODEL 61 VS

Ideal stub user. Constant peripheral speed regardless of wheel diameter for increased production and longer wheel life. For vitrified or high speed grinding wheels.



GENERAL PURPOSE FLOOR GRINDER
MODEL 500

Totally enclosed motor, 1 to 5 hp. Push button starting with overload protection. Ball bearings enclosed in dust-tight housings. Enclosed adjustable wheel guards.

You need these tools . . .

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on your firm letterhead

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Bench
Floor
GRINDERS
Angle plate
Bench
Brake drum
Floor
Portable
Precision

SWING FRAME

Tool post
Vertical Spindle
Wet
DRILLS
Portable electric
DUST COLLECTORS
HEAT GUNS
DRILL STANDS
Post bracket

NUT SETTERS

SCREW DRIVERS
POLISHERS
Portable
Bench
Floor
SANDERS
Disc, portable
VALVE SEAT GRINDERS
and many other tools

THE UNITED STATES ELECTRICAL TOOL COMPANY
3646 Llewellyn Street, Cincinnati 23, Ohio

For more data circle 386 on Reader Service Card

new shop equipment . . .

to permit easy replacement and adjustment of the tool insert and chip breaker. This spring is so designed that it also serves to lock the chip breaker adjustment screw and maintain adjustment. The holder is regularly furnished with a large hexagonal socket head clamping screw, although a square head screw with

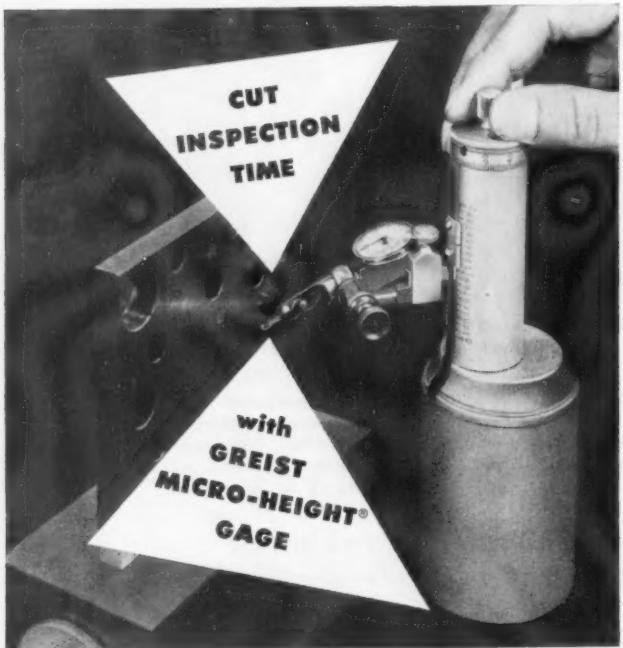
shoulder for high clamping efficiency is optional.

According to the manufacturer, the chip breaker is made to precision tolerances with the lower face ground to provide full, uniform contact with the upper face of the tool insert. A replaceable, indexable shim, held in place by a flat head machine screw, is ground on both faces to provide perfect seating and prevent wobble of the tool insert. The assembly is designed

to prevent chips, scale and debris from accumulating under the clamp and around interchangeable parts.

Superigid Toolholders are made in 1 by 1, 1 by $1\frac{1}{4}$ and 1 by $1\frac{1}{2}$ inch shank sizes, right and left hand, for special $\frac{3}{4}$ inch square and $\frac{5}{8}$ inch included circle triangular Diamonite Oxide indexable lozenge insert turning tools, shoulder tools and facing tools, with negative, neutral and positive rake.

For more data circle 97 on Reader Service Card



Precision-built Micro-Height reads faster than your micrometer! It measures height direct from zero at base to 3". Hundredths on barrel . . . thousandths on large head that cuts reading time! Attach your dial indicator for quick measuring between holes, surfaces!

CUT LAYOUT TIME! Micro-Height also scribes like your vernier height gage. Riser extends range to 9". Precision-built, satin-chrome finished Micro-Height Gage quickly pays for itself!

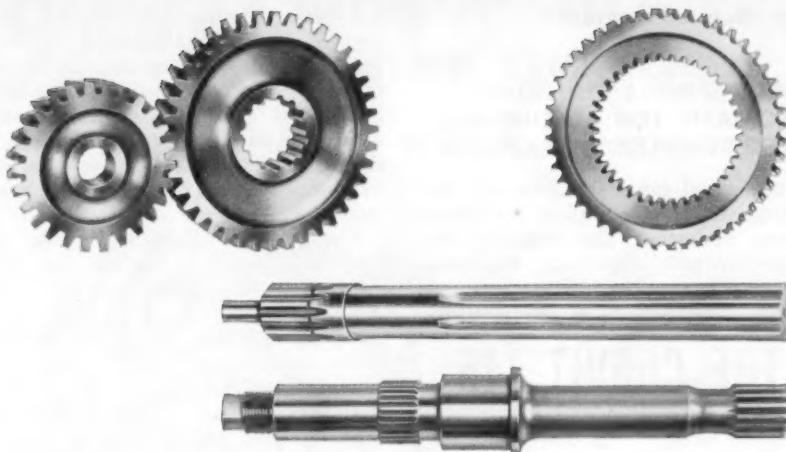
Call your distributor or write

THE **GREIST** MANUFACTURING CO., 491 BLAKE ST., NEW HAVEN 15, CONN.
Precision Products since 1871

For more data circle 387 on Reader Service Card



View of Diamonite Superigid Toolholder



Lengthen the life of your product

You will get real customer satisfaction when you use Adams Gears . . . they are custom-built for the smooth, effective power transmission and proper load distribution that add stability and long life to your product.

When you standardize on Adams Gears for your product, you get more economical production. Gears designed for the specific job and built exactly to your specifications save time and money on the assembly floor. Write to The Adams Company, 1942 Cypress St., Dubuque, Iowa.

The Adams line . . . Spur Gears . Helical Gears . Bevel and Miter Gears . Worms and Worm Gears . Sprockets . Internal Gears (spur and helical) . Ratchets . Splined Shafts . Lead and Feed Screws . Shaved Tooth Gears (spur and helical) . Ground Thread Worms . Racks

The ADAMS Company

Dubuque, Iowa, U. S. A.

ESTABLISHED 1883

FINE GEARS MADE TO
YOUR SPECIFICATIONS

For more data circle 388 on Reader Service Card

JANUARY, 1957

modern machine shop 241



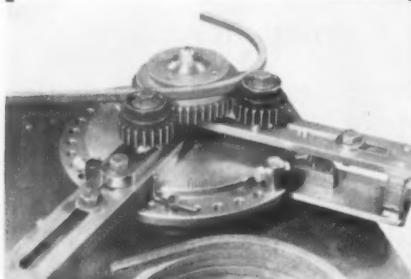
new shop equipment . . .

**SINGLE SPINDLE CHUCKING
AUTOMATIC FOR MACHINING
LARGE COMPLEX WORKPIECES**

Engineered for fast, automatic machining of large, complex workpieces in one operation, the versatile 3AC Single Spindle Chucking Automatic

THE CURVIT 145

— For Coiling Metal —



An unusual Metal Forming Machine designed to put uniform curves in strips, bars and tubes.

Photograph shows one-half inch square steel being formed into coils, finished coil in foreground.

The CURVIT 145 is one of a complete line of Metal Forming Machines made by

Kilham Engineering Co., Inc.

R.F.D. NORTH ATTLEBORO

MASSACHUSETTS

MYrtle 5-6211

For more data circle 389 on Reader Service Card

242 modern machine shop

has been announced by The Warner and Swasey Co., Cleveland, Ohio. A husky addition to the company's line of single spindle automatics, the 3AC, because it combines accuracy, quick setup and ease of operation, is regarded as ideal for short as well as long production runs of large size precision work.

During the machining cycle, the 3AC is claimed to provide automatic regulation of spindle speeds, feed changes, cutting stroke length, turret indexing and both front and rear cross slide operation. Speed and feed changes can be made under cut to maintain optimum cutting conditions. The machine operator has only to load the workpiece, press the cycle start button and then unload the finished work when machining is completed. As many duplicate pieces as desired can be readily produced in succession without resetting the machine controls.

Quick setup of the 3AC is obtained through a simple placement of switch operating screws in the index control drum, which regulates the various machine functions, and by setting easily adjusted trips on the machine's pentagonal control drum for desired feed rates, spindle speeds and cutting stroke lengths. According to the manufacturer, no time-consuming cam changing is required and the simplicity and accessibility of both the adjustments and tooling stations permit

JIG BORING

and

Large Precision Machining

Done to your specifications

We Have 21 Jig Borers

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE ROSELAND, N. J.

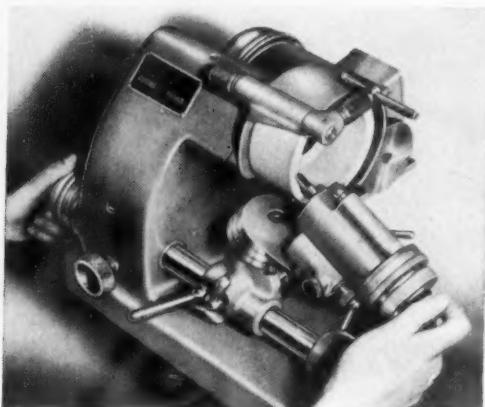
For more data circle 390 on Reader Service Card

January, 1957

DECKEL

Single-Lip Cutter Grinder

Low Cost Resharpening With Extreme Accuracy



• Reduces Expensive Inventory

• Operated By Semi-Skilled Workers

The precision performance of the SO Single-Lip Cutter Grinder can save you time, space and money — while improving the quality of your machining operation. A simple grinding job — even by semi-skilled workers — will accurately shape or resharpen all types of single-lip cutters, tracing styles, center bits and straight-fluted two- or three-lipped milling cutters. The entire work-holding fixture is mounted on a tubular slide permitting coarse and fine longitudinal adjustments. Two swivel bearings on the base of the work arm and an adjustable slide on the index head provide equally fine settings for all desired tool profiles, relief angles and off-center radii.

This Deckel Cutter Grinder lets you reduce expensive inventories of finished tools — stock only semi-finished ones. Worn or damaged single-lip cutters are easily reconditioned and saved from the scrap heap. Designed as a bench machine, it takes little space, can be conveniently installed. Chances are it can do several jobs for you right now. It pays its own way in no time.

Write For Catalog

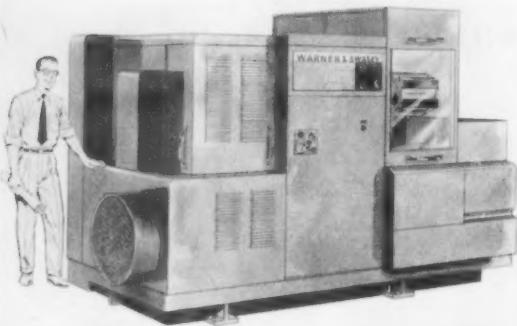
COSA

— nationwide sales and service of precision machine tools —
— from bench lathes to boring mills.

COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.
IN CANADA contact COSA CORPORATION OF CANADA, LTD., 1160 Lakeshore Rd., Long Branch, Toronto 14, Ont.

For more data circle 391 on Reader Service Card

new shop equipment . . .



Warner and Swasey 3AC Chucking Automatic

rapid, accurate setup by even semi-skilled workers.

The 3AC's ruggedly designed overhead turret is positioned above areas

of cutting chip, coolant and dirt accumulation for long-life accuracy, and it is offset from the spindle centerline to facilitate workpiece loading. By mounting both the turret and spindle bearings in the same housing, greater accuracy is said to be provided and precision workpiece tolerances are maintained without constant adjustment of cutting tools to compensate for changes caused by temperature effects. The turret location provides increased rigidity for large diameter work, since the larger the workpiece the closer the cutting tools are placed to the guiding ways of the machine.

Any six spindle speeds—from a high range of 65 to 826 r.p.m., or a low range of 30 to 385 r.p.m.—may be selected and obtained automatically during the machining cycle. An arrangement of hydraulic clutches in the transmission is said to eliminate the need for changing speed pick-off gears.

**Greater
Precision!
Increased
Production!**

Any combination of . . . turning . . . tapering . . . facing . . . chamfering . . . trepanning in one pass. Exclusive micrometer adjustment feature for rapid set-up. Cutting capacities from $1/32''$ to $2''$ diameter in standard stock.

WRITE FOR CATALOGUE No. 20MM

Our engineering department is at your disposal on your hollow mill problems.

**KUTMORE
ADJUSTABLE
HOLLOW MILLS**

CARL WIRTH & SON, INC.

1625 CLINTON AVE. NO.
ROCHESTER 5, N. Y.

For more data circle 392 on Reader Service Card

**"ARMED" For MORE
VERSATILE
WORK!**

NEW

GREAVES TOOLMAKERS OVERARM

Here's the way to add new "firepower" to toolroom milling operations! Install in your toolroom a GREAVES MILL equipped with this new Toolmakers Overarm.

You'll discover new versatility for milling intricate jig and fixture work, for keywaying, slotting and angular milling. Two graduated swivels permit mounting the spindle head in almost any angle for milling, drilling, spot facing and related operations.

Powered by an independent 2 HP motor, the unit is driven through helical gears. Eight speeds may be selected with convenient controls operating speed change clutches. A hand-fed quill attachment provides 4" tool travel to the spindle. Arbor support fits overarm, permits arbor type milling without changing overarm.

Write for Complete Specifications and Prices

GREAVES MACHINE TOOL DIVISION
J. A. FAY & EGAN COMPANY
2700 Eastern Avenue, Cincinnati 2, Ohio

- Swivels permit any angular setting of spindle head.
- 2 HP Independent motor drive.
- 8 speeds from 175 to 1750 RPM.
- Quill has 4" hand feed.
- Spindle equipped with No. 50 N. S. taper; reduced to No. 2 Morse taper when Quill Attachment is used.
- Gears run in oil bath.
- Full vision oil level gauge.

RACK FEED. The overarm is equipped with rack feed for positioning over work.

Manufacturers of
GREAVES MILLS
"the MOST Mill for
the LEAST Money!"

For more data circle 393 on Reader Service Card

new shop equipment . . .

A range of 36 feeds, from 0.0019 through 0.124 inch, is available on this machine. Any six of these feeds may be selected during setup simply by placing the proper change gears in the readily accessible feed transmission gear box and by adjusting the trips on the pentagonal control drum. Change gears also can be furnished to lead in



SLEEVES AND SOCKETS AND A complete line of COLLETS

• COLLIS Taper Tools are made by men skilled in this type of manufacture. Users get long satisfactory service from COLLIS Equipment and find the answer to all drilling, reaming, and tapping needs in the COLLIS line. We can give prompt service on orders for Lathe Centers, Arbors, Drill Drifts, and Magic Type Chucks as well as on Sleeves and Sockets and Collets.

THE COLLIS CO.
DEPT. A, CLINTON, IOWA

For more data circle 394 on Reader Service Card

246 modern machine shop

taps or die heads used in cutting right-hand threads from 7 to 32 threads per inch. A left-hand threading arrangement is available on special order.

The 3AC swings 13½ inches over the cross slide and offers a maximum pentagon turret working stroke of 11 inches. The spindle has an 11 inch Type A-2, American Standard, flanged nose and is equipped with an air-operated 15 inch chuck. The standard drive motor is a 40 h.p., non-reversing type unit. Two-speed motors and reversing motors also are available for special requirements.

For more data circle 98 on Reader Service Card

★ ★ ★

IN-LINE TRANSFER TABLE HAS NO FIXTURES

Dixon Automatic Tool, Inc., 2300 Twenty-Third Ave., Rockford, Ill., has announced an In-Line Transfer Table, without fixtures, which transfers piece parts from station to station for automatic or manual operations. The Dixon In-Line Transfer Table can be adapted to multiple, consecutive operations and is said to handle 6,400 pieces per hour.

Designed for piece parts which have a flat surface on which to slide along a track from station to station, this transfer table is claimed to cam lock piece parts at each station within 0.005

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**TAPER
ATTACHMENTS**
For All Lathes—Old or New—
9" to 36" Swing
Write for Bulletin
MASTER-TAPER COMPANY
4531 N. Beacon St., Chicago 40
Excl. Mfrs. of Taper Attachments

\$29.50
to
\$149.50

For more data circle 395 on Reader Service Card

January, 1957

15,000 THREADED NAILS per hour with HARTFORD Thread Rollers . . . *Automatically*

USER REPORT:

From Chas. F. Baker & Co., Framingham, Mass., John P. Hillberg, General Manager: "Hartford Special machines have been more than satisfactory on production and especially economical on up-keep."

QUICK SPECS

Nail Diam. Capacity—.080" to .169"
Thread Length Capacity— $\frac{1}{8}$ " to 2"
Production Rate—250 pcs. per min.
Floor Space Required 4' x 5'
Machine Size—42" x 26" x 52"

For detailed information write for
Bulletin TR-102.

Machine Tool Accessories Division
THE HARTFORD SPECIAL MACHINERY CO.
27511 Homestead Ave., Hartford, Conn.

Nail down the answer to your
nail and screw threading
problem. Check the specs.

HARTFORD
Special

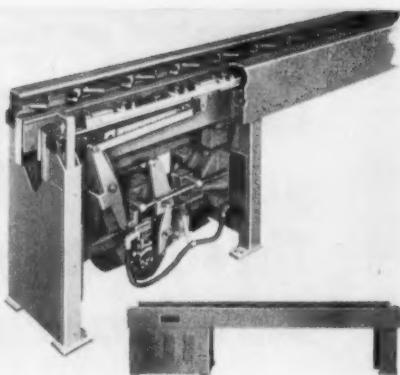
For more data circle 396 on Reader Service Card

new shop equipment . . .

inch tolerance without auxiliary locating devices. When tolerance is less than 0.005 inch, a shot pin or locating lug on the piece part can be utilized.

The base support of the transfer table contains an intermittent drive unit and may be located at either end or in the middle of the table to suit the production requirements. In-line construction allows the operators to work from both sides of the table and machines or equipment are readily accessible from either side for adjustment or tool replacement.

Acceleration and deceleration during indexing is designed for high-speed and precision. Index distance can be varied from 3 to 9 inches and index time from 0.25 to 0.7 seconds. Since the inertia loads are low, fast indexing can be accomplished quietly and efficiently with a total cycle time from



View showing Dixon In-Line Transfer Table

0.56 seconds. The dwell time is adjustable.

Dixon In-Line Transfer Tables are available in lengths from 5 to 12 feet. Longer tables are available.

For more data circle 99 on Reader Service Card

★ ★ ★ ★

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HANDLES
and BLANKS**

available for
immediate
delivery

Also available
Trilock and Spline
Gage Handles

A. G. D.
Standards



**Double End Reversible
Gage Handle**

Established 1938

Royal Oak Products Co.

2828 John R St. (P.O. Box 161) Royal Oak, Michigan
Phone Lincoln 2-1780

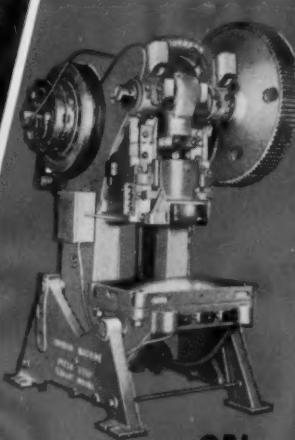
manufacturers of gage handles and blanks

Write for Catalog

For more data circle 397 on Reader Service Card

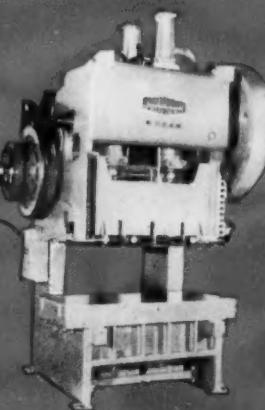
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MORE for their money...
that's why they buy these**

3 JOHNSON PRESSES



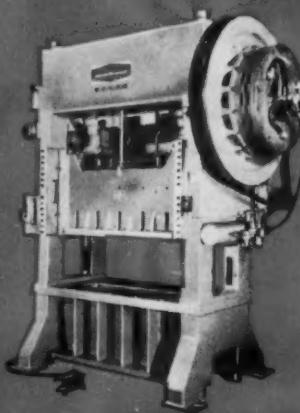
OBI

23 Models ranging from 16 to 150 tons capacity in regular, special wide or high speed types—pin or air clutch.



GAP DOUBLE-CRANK

**60-100-125 and 150 ton capacities,
steel fabricated, air clutch, flywheel
or geared models.**



STRAIGHT SIDE DOUBLE-CRANK

**40-60-80-100-125 and 150 ton capacities.
Tie rod, steel construction
and air clutch.**

Write for Bulletin 1956

Johnson

**MACHINE
and PRESS CORP.**

620 WEST INDIANA AVENUE • ELKHART, INDIANA

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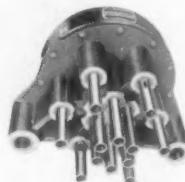
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DRILLHEADS

Universal Joint Type
Drillhead . . . Full Ball or Bronze Bearing Construction, Standard or Heavy Duty. From $\frac{1}{2}$ " minimum centers up. Capacities to $\frac{1}{2}$ " in Steel.



Single and Double Eccentric Type Adjustable Drillhead . . . Enclosed, Full Ball Bearing Construction. New Double Eccentric Type illustrated.



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Products Corporation.

A SUBSIDIARY OF
THOMSON INDUSTRIES, INC.

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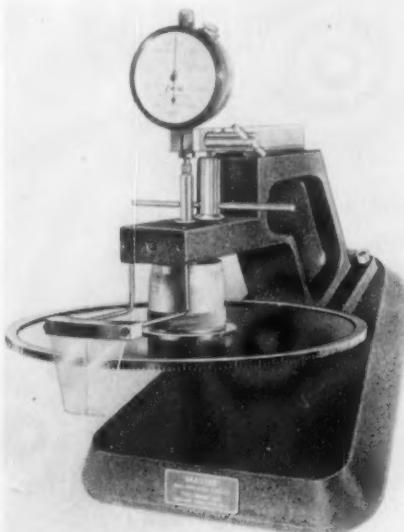
250 modern machine shop

new shop equipment . . .

INSTRUMENT CHECKS DIAL INDICATOR ACCURACY

The Master Dial Indicator Checker, a quick, easy to use and dependable method of checking the accuracy of all A.G.D. indicators, is available from Petz-Emery, Inc., Pleasant Valley, N. Y. This instrument provides large users of dial indicators and dial indicator service departments with a rapid, reliable means of periodic checking and enables them to check new, incoming indicators for stated accuracy, and repaired indicators for original factory accuracy.

In operation, the accuracy of the dial indicator is checked against a large, calibrated wheel, 8 inches in diameter with a micrometer barrel as its hub. Graduations of 0.0001 inch are marked on the outer rim of the wheel



Petz-Emery Master Dial Indicator Checker

January, 1957

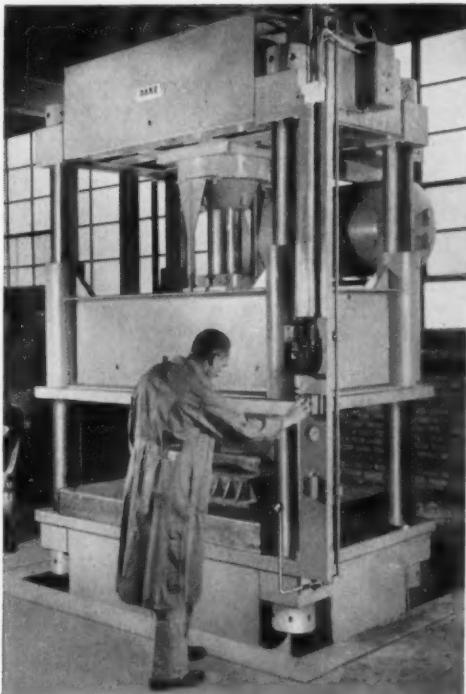
PROBLEM

*to produce low-cost
prototypes of a new design
without the high cost
of permanent tooling*

SOLUTION

*a single 300-ton Drake
Hydraulic Die Tryout Press
with temporary tooling*

Die tryout is a key operation for most die jobbing shops. This is the test that either proves or rejects a die before it is placed in production. But a lack of adequate press facilities is usually the big drawback. A well-known Chicago diemaking company, Cripps Engineering and Tool Co., Inc., has effectively solved the problem of die tryout. Although they had a number of production presses, there was a need for greater die try-



out capacity. Now with a single 300-ton Dake Hydraulic Press, this die-maker is able to test all dies before delivery to the customer. The result: shop down time is held to a minimum and production efficiency runs smoothly without interruption. Specifications for single-acting and double-acting die tryout presses in eighteen electrically operated models are contained in Bulletin 330. Write today for your copy.

DAKE CORPORATION, 612 Seventh St., Grand Haven, Mich.

**DAKE
PRESSES**



Arbor
Presses



Hand-Operated
Hydraulic



Power-Operated
Hydraulic



Guided
Platen



Gap Type
Presses



Movable
Frame

For more data circle 400 on Reader Service Card

new shop equipment . . .

and may be lined up with a hairline sight. The indicator contact point is set against the micrometer spindle by means of a vernier zero adjustment which does not require locking. The user merely turns the wheel for a given distance and then checks the re-

sultant reading on the indicator. Readings to 0.00002 inch are said to be easily estimated. According to the manufacturer, the "Master" checks indicators in all ranges up to 1.000 inch. It is supplied in an attractive wooden case.

For more data circle 100 on Reader Service Card

★ ★ ★

MEDIUM-DUTY COOLANT PUMP

Complete and self-contained in a compact unit, the Model 505-T Coolant Pump and Tank has been designed by The Brady Pump Corp., Muncie, Ind., for either permanent or portable coolant supply for all small and medium size machine tools. According to the manufacturer, it weighs only 27 lb. and can pump from 1 to 500 gallons per minute of light oil or soluble compounds to work. Heavier oils and compounds can also be used at lower gallonage.

Equipped with built-in baffle to remove chips and abrasive particles from stream of coolant through pump, the tank has a capacity of six gallons. The galvanized steel tank is painted outside in pleasing machinery green for appearance, and inside for extra corrosion resistance.

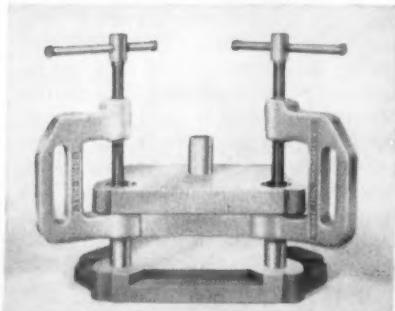
This standard unit operates on 115 volt, 60 cycle, single phase current or it can be supplied for use on 230 volt,

**DRILL and
PILOT
BUSHINGS**
Frictionless
—Rotary
For core drilling, T.
C. and high speed
boring, turret tool,
piloting, etc. Won't
stick or clog. Dust
proof as a watch.
Write for details.

GATCO ROTARY BUSHING CO.
42330 Ann Arbor Road, Plymouth, Michigan

For more data circle 401 on Reader Service Card

economically priced press room equipment



DURANT Die Set Pullers

Easily removes punch holder from die shoe by a straight upward pull, yet protects the die set. 3 Models fit all sizes of die sets. Priced from \$18.00 per pair.

WRITE FOR NEW FREE CATALOG

DURANT TOOL SUPPLY CO.
PROVIDENCE 3, RHODE ISLAND

For more data circle 402 on Reader Service Card

252 modern machine shop

CAMS

MADE TO YOUR SPECIFICATIONS

—Except Screw Machine Cams—

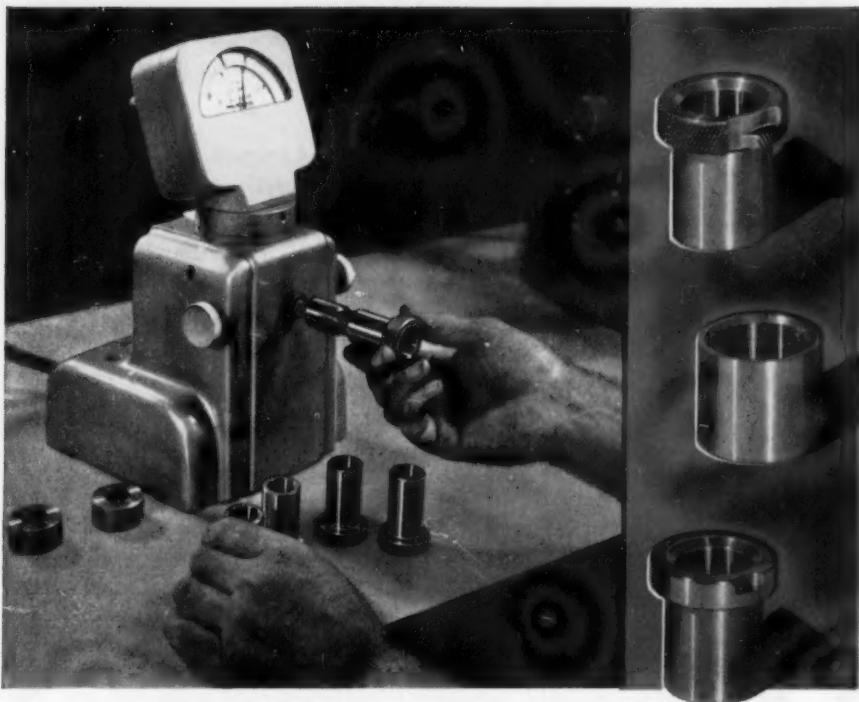
Design Assistance Offered

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 403 on Reader Service Card

January, 1957



EX-CELL-O BUSHINGS LAST TWICE AS LONG

Customer's test proves there is a difference in bushings

New tests by major equipment manufacturer proved beyond doubt Ex-Cell-O Bushings last twice as long as other bushings! After drilling 16,300 holes, wear on other bushing brands averaged .0039"—ready for scrap! Wear on Ex-Cell-O Bushings averaged only .0017".

Here's why: (1) Ex-Cell-O Bushings are made of high chrome and high

carbon oil-hardening bearing steel, (2) automatic atmosphere-controlled heat treating for uniform hardness, (3) precision grinding inside and out, (4) head type bushings and liners are ground under the head for perfect seating.

Call your Ex-Cell-O Representative or write Ex-Cell-O, Detroit. You'll get same day shipment.



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TOOLS • GRINDING SPINDLES • CUTTING TOOLS
• RAILROAD PINS AND BUSHINGS • DRILL JIG
BUSHINGS • AIRCRAFT AND MISCELLANEOUS
PRODUCTION PARTS • DAIRY EQUIPMENT

56-58

For more data circle 404 on Reader Service Card

January, 1957

modern machine shop 253

new shop equipment . . .



Brady Model 505-T Medium-Duty Coolant Pump

60 cycle, single phase current when required. Each unit is supplied with

two 8-foot lengths of hose and nozzle, ready to plug in and use.
For more data circle 101 on Reader Service Card

★ ★ ★

ORBITAL SANDER IS LIGHTWEIGHT

Development of the Model 800 Lightweight Orbital Sander, weighing only 3 lb. and fitting readily into the palm of the hand, has been announced by the Pneumatic Division, Sundstrand Machine Tool Co., 2539 Eleventh St., Rockford, Ill. The high-speed unit operates on 6,000 cycles for fast material removal and operates at 40 p.s.i. air pressure. Air consumption is only 5 to 7 c.f.m.

Because it weighs only 3 lb., this orbital sander can readily be used by women operators without fatigue. Easy palm lever control makes it ideal for

Have you seen what they can do?

Wilder SMALL PARTS COMPARATOR

with VERTICAL LIGHT BEAM

and "Deep-Etch" COMPARATOR CHARTS

The ideal combination for the optical inspection of precision parts with contours, radii, angles.

Magnifications from 10X to 150X.

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OPTO-METRIC TOOLS, INC.

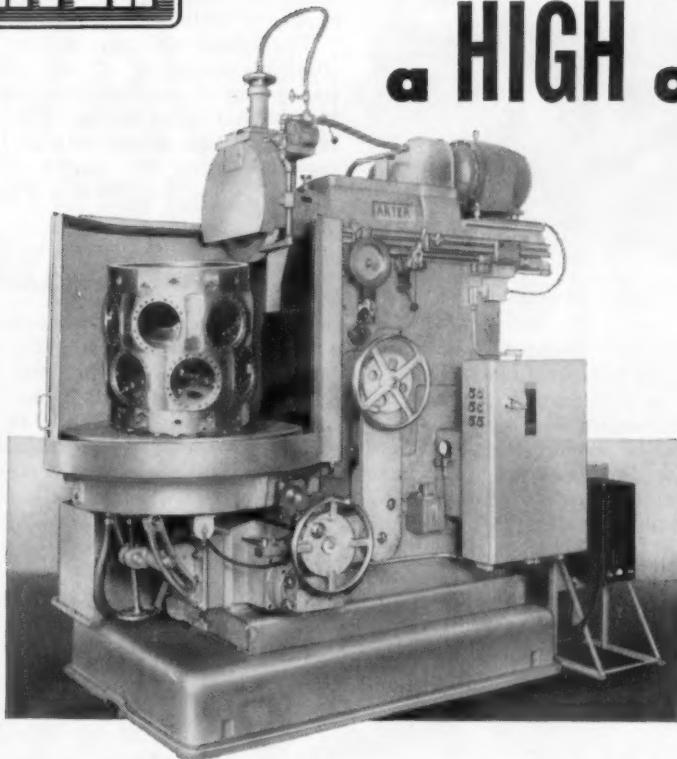
137MM YARICK STREET, NEW YORK 13, N.Y.



For more data circle 405 on Reader Service Card

ARTER

**also makes
a HIGH one**



Vertical capacity of Arter Model B Hydraulic Rotary Surface Grinder can be increased 24" using a raising block. So, for grinding surfaces on such work as the crankshaft housing for the piston-type airplane

engine, as shown, Arter has the answer. Arter has been building rotary surface grinders for nearly forty years. Model B is built in four sizes — 20", 24", 30" and 40" diameters.

Whatever your surface grinding needs, Arter can meet them.

ARTER GRINDING MACHINE COMPANY

WORCESTER 5, MASSACHUSETTS

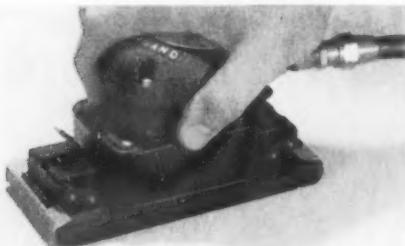
Jigmatic Automatic Tape Controlled Positioning Table • Rotary Surface Grinders
Flat Circular Cutter Grinders • Internal Grinders • Cylindrical Grinders • Carbide Tool Grinders
AGENTS IN INDUSTRIAL CENTERS OF UNITED STATES AND CANADA

For more data circle 406 on Reader Service Card

January, 1957

modern machine shop 255

new shop equipment . . .



Sundstrand Model 800 Orbital Sander

restricted areas—it can go just about anywhere the hand can reach. It is designed to be able to sand right up to edges and moldings.

Despite its small size and light weight, the Model 800 is claimed to have the ability to remove material in volume and is an ideal unit for rough

sanding and preliminary operations. The sander can be used for wet sanding, if the operator provides a separate supply of water.

The Model 800 takes a 3 by 8 inch sheet of sandpaper. A new design of paper clip is used that is unusually sturdy and quick-acting. The rubber boot is a dust shield only and is not used to control the sander.

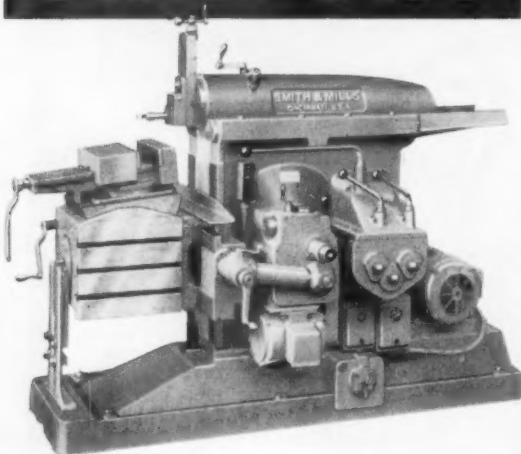
For more data circle 102 on Reader Service Card

★ ★ ★

PIN AND WING TYPE CLAMPS

Supplementing its wide range of sizes and patterns of Hargrave clamps, The Cincinnati Tool Co., 1947 Waverly Ave., Cincinnati 12, Ohio, has introduced its new look No. 44 Superclamp Twins. These are identical except for the handle; one is a pin type and the other a wing. Each clamp is power tested, Type "C." This clamp

SHAPERS



Heavy Duty Models in 16", 20", 25", 28", 32", 36" strokes, Standard Duty Models in 20", 24" strokes.

For more data circle 407 on Reader Service Card

Compare Smith & Mills for versatility, speed, cutting power and precision performance. Compare and you'll buy Smith & Mills—famous for high quality shapers since 1888. Write for prices, deliveries, repair parts or field service. Smith & Mills Shaper Div., Nebel Machine Tool Corp., 3409-B Central Parkway, Cincinnati 25, O.

**Smith
AND
Mills**
SHAPERS
CINCINNATI

New 6" x 18" hand feed **Thompson** **Grinder**

FOR SHOPWORK
OR TOOL ROOM

Completely anti-friction and per-
manently lubricated machine.
Available with all types of at-
tachments found on tool room
surface grinders including inter-
changeable horizontal and ver-
tical wheel heads. A Thompson
high quality precision machine
at this low price.



PRECISION PETE says:

FOR LOW COST AND QUALITY
YOU JUST CAN'T BEAT THOMPSON
Make your next hand feed grinder a
Type D Thompson . . . write today for
the new descriptive catalog, D-55

* Write today for quotation

Call, write or wire today

The Thompson Grinder Company at Springfield, Ohio

For more data circle 408 on Reader Service Card

January, 1957

modern machine shop

257

Thompson
Grinders

SPECIFY TOP QUALITY



ARBOR SPACERS

SHIMS and SPACING COLLARS • Arbor Spacers and Shims in 20 sizes and thicknesses from .001" to .125". Arbor Spacers furnished with standard keyway; Shims, with no keyway. Also Spacing Collars in numerous popular diameters, and in thicknesses from $\frac{1}{8}$ " to 3". Hardened and ground; edges chamfered. Furnished with standard keyway.



FEELER STOCK •

Made from tempered stock, rolled to close tolerances, $\frac{1}{2}$ " x 25' coils packaged in transparent plastic boxes, except above .020". Strips $\frac{3}{4}$ " x 12", in cellophane. 27 thicknesses. All thicknesses from .001" to .032". (For use in precision fitting, checking clearances, inspection and production work.)

SHIM STOCK •

Steel or brass. Selected from material rolled to precision limits, free from burrs, and protected by oil coating. Coils packed in carton for easy dispensing and protection. 15 thicknesses, .001" to .032". Sheets 6" x 12"; coils 6" x 120". Available also in two assortment packages—12 thicknesses, .001" to .015", and 15 thicknesses, .001" to .032".



WRITE FOR



Illustrated Brochure
and Price List!



DETROIT STAMPING CO.

J49 MIDLAND AVE., DETROIT 3, MICHIGAN
For more data circle 409 on Reader Service Card

new shop equipment . . .



View showing Hargrave No. 44 Superclamp

is furnished with sliding pin handle, unless steel wing handle is specified.
For more data circle 103 on Reader Service Card

★ ★ ★

BORING BARS AVAILABLE IN SIZES FROM 1 $\frac{1}{2}$ TO 2 $\frac{1}{2}$ INCH SHANK DIAMETER

Boring bars, based on Kenedex triangular button inserts, have been introduced by Kennametal, Inc., Latrobe, Pa. Produced in sizes ranging from 1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ inch shank diameter, these tools are said to offer the advantages of hard carbide cutting edges with the economy of small buttons, which can be indexed and turned in seconds to give six cutting edges. Inserts are available in $\frac{3}{8}$ and $\frac{1}{2}$ inch inscribed circle.

For more data circle 104 on Reader Service Card



Illustration showing Kennametal Boring Bar



New **Starrett**® No. 123 Satin Chrome MASTER-VERNIER CALIPER

Here is a new Vernier caliper that can be used with supreme confidence in its master precision... a gage with Starrett no-glare *Satin Chrome Finish* for easy reading and rust and stain resistance... with new, long 50-division Vernier scales for simplified setting and error-proof reading without a magnifying glass... with new flush fitting Vernier scales to eliminate parallax errors... with new open-face design which provides both inside and outside Vernier scales on the same side of the tool — you hold and read it exactly the same for all measurements.

If you take pride in the precision standards of your shop, you'll want the new Starrett No. 123 MASTER-VERNIER Caliper... for its positive precision, error-proof design and lifetime accuracy.

Your Industrial Supply Distributor will gladly demonstrate its many outstanding new features... or send for descriptive folder.

NO OTHER VERNIER GAGE GIVES YOU ALL THESE STARRETT FEATURES

SATIN CHROME FINISH — no glare, easy reading, long wearing, rust and stain resisting.

NEW LONG VERNIERS with widely spaced graduations for easy setting and reading.

FLUSH FITTING VERNIER PLATES to eliminate optical reading errors.

OPEN-FACE DESIGN with inside and outside scales on the same side — no need to turn the tool.

HARDENED, STABILIZED master bar for maximum rigidity, resistance to wear, lasting accuracy.

EXTRA LONG ADJUSTING JAW for greater bearing surface to assure perfect squareness.

NEW JAW DESIGN for greater rigidity and resistance to springing.

12- AND 24-INCH SIZES graduated in thousandths to read the full 12- or 24-inch length.

BIG NEW CATALOG NO. 27

Describes and illustrates the complete Starrett line. Ask your Industrial Supply Distributor or write for free copy. Address Dept. MD, The L. S. Starrett Company, Athol, Massachusetts, U. S. A.

SINCE 1880
WORLD'S GREATEST TOOLMAKERS

Starrett®

MANUFACTURERS OF
MEASURING, HAND MEASURING, TOOLS AND PRECISION INSTRUMENTS
BENCH INDICATORS • STEEL TAPE • PRECISION GROUND FLAT STOCK
HACKSAWS • HOLE SAWS • BAND SAWS • BAND KNIVES



For more data circle 410 on Reader Service Card

new shop equipment . . .

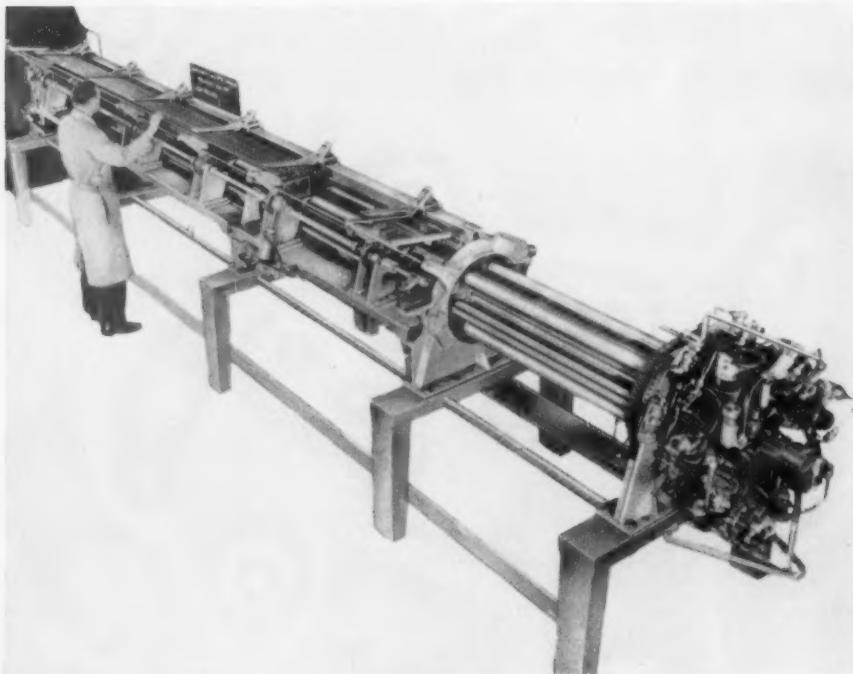
BAR FEED FEATURES AUTOMATIC LOADING DEVICE

Lipe-Rollway Corp., Syracuse, N. Y., has introduced a multiple-spindle bar feed that automatically indexes to as many as eight fixed-stop positions on bar automatics, holds several hours' supply of stock, ejects remnants and reloads automatically.

The bar feed consists essentially of a magazine on which stock is racked diagonally to a reel containing four, six or eight split stock tubes, or spindles, depending on the number of machine operations and corresponding exactly to spindle positions on the bar

automatic; air-operated motors, one to a spindle, giving force to a stock pusher within each tube that moves stock against the collet jaws to a fixed stop position on the bar automatic, engaging the machine clutch; an air-operated braking mechanism which halts the revolution of the spindle reel when it reaches its proper index position; a hydraulic check unit, controlling the feed out of stock against the stock-stop at a constant rate; and a safety shut-off device to stop both the bar feed and the machine in the event of jamming.

Operation of the machine is completely automatic and involves no manual adjustment during a production run. Moreover, stock can be loaded into the magazine at any time



View showing Lipe Multiple-Spindle Bar Feed with covers removed to display operating parts

3 REASONS WHY SUTTONS ARE THE BEST BUY!

1
Serrations
Are
DIAMOND-
GRIP!

2
Temper and
Tension
Controlled
Heat Alleviates
Uniformity!

3
Deliveries
Immediate
Shipment
of Popular
Sizes!



Standard collet for
ACME-GRIDLEY,
CONE, NEW
BRITAIN GRID-
LEY, and WARNER
& SWASEY AUTO-
MATIC BAR
MACHINES.



Style "I" master
feeder with inter-
changeable and
replaceable pads.

COLLETS AND FEEDERS FOR ALL AUTOMATICS!

AUTOMATIC BAR MACHINES

STANDARD COLLETS AND FEEDERS;
MASTER COLLETS AND PADS;
MASTER FEEDERS AND PADS;
FULL FLOAT MASTER COLLETS AND
JAWS; COLLET AND FEEDER
TUBES; SPOOLS AND BUSHINGS



Standard collet for
BROWN &
SHARPE AUTO-
MATICS.

TURRET LATHES

STANDARD COLLETS; MASTER
COLLETS AND PADS



Standard collet for
4 and 6 spindle
GREENLEE AUTO-
MATIC BAR
MACHINES.

LATHES AND MILLING MACHINES

COLLETS FOR ALL MAKES

SPECIAL

COLLETS; TOOLS; CHUCK JAWS;
HOLDING DEVICES



Super (cage-type)
adjustable tension
feeder. For all
Automatics.

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Sutton Tool Co.

Dept. MMS1, Sturgis, Michigan



Standard collet for
DAVENPORT
AUTOMATIC BAR
MACHINES.

For more data circle 411 on Reader Service Card

new shop equipment . . .

the operator chooses. Addition of a simple auxiliary rack can substantially increase magazine capacity, if desired. One of the bar feed's safety features is an automatic shutoff which stops both the feed and the bar automatic in the event a bar would be jammed during loading.

Stock sizes which this bar feed can accommodate presently are 2 inches maximum and $\frac{1}{4}$ inch minimum.

For more data circle 105 on Reader Service Card

★ ★ ★

INTERNAL MEASURING INSTRUMENT

A highly accurate electronic gaging system, claimed to be unaffected by line voltage fluctuations, is incorporat-



Sheffield Internal Measuring Instrument

ed in the Model N-7 Internal Measuring Instrument, manufactured by The Sheffield Corp., Dayton 1, Ohio. The N-7 Internalchek is a heavy-duty shop and laboratory instrument for inspecting internal diameters of ring

**PAYS
for
ITSELF**

Sharpen just one gross of hack saw blades (at least 6 times) and you actually will save the price of this machine.

WARDWELL MODEL EC COMBINATION GRINDER is the only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

Write for Bulletin EC Today

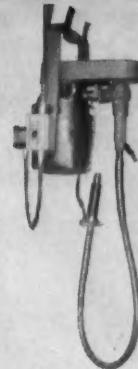
WARDWELL
MANUFACTURING CO.
3803 Ridge Rd., Cleveland, O.

Maker of Largest Line of Saw and Tool Sharpening Machines

For more data circle 412 on Reader Service Card

R. G. *haskins* Co.

FLEXIBLE SHAFT MACHINES



faster

Haskins machines will speed production on a big variety of metal-working jobs with their continuous speed and unerring performance. And there's no need to worry about changing tools—it takes just seconds to switch to any one of the numerous metal-working attachments in the Haskins line. *Use Haskins equipment and eliminate interruptions.*

easier

Haskins flexible shaft machines make the whole operation a simple matter. They're portable—ready to go to work in whatever spot you choose, even remote sections of your plant. Operators say Haskins machines are easy to use because they have to hold only the lightweight handpiece which permits greater accuracy for close, precision work. You should know about Haskins flexible shaft machines and accessories—*leaders in their field for over 30 years.*

Write Today for a Catalog and Literature



R. G. HASKINS CO.

264 West Harrison Street

Chicago 12, Illinois

For more data circle 413 on Reader Service Card

new shop equipment . . .

gages and other parts for size, taper, bellmouth and out-of-roundness. Standard capacity is from 0.370 to 12 inches with vertical capacity to 1½ inches. Special gaging arms can be obtained to provide gaging range from 0.240 inch to 12 inches with vertical capacity to 1 inch.

Did you know that - - -

Several of your home appliances probably were gaged with Comtorplug



Precision Internal Gage

**SIZES FROM
1/8" to 8"
AND LARGER**



COMTORPLUG with interchangeable expanding plugs to gage simple or special bores from 1/8" to 8" dia.

Unique Advantages

- Positive gaging accuracy to fraction of .0001" regardless of who operates it.
- Indicates actual size, a fixed—not passing—reading.
- Positive 2-point gaging—automatic centering.
- Shallow holes, deep holes, inside splines, open-end holes gaged easily.
- Detects ovality, back or front taper, bell mouth, barrel shape.
- Reaches to bottom of blind holes.
- Gages work while still held in chuck.
- A shop tool for all-day every day use.
- Portable—no wires, hoses or stands.

Investigate the gage used by the thousands in jet engine, automotive transmission, household appliance, farm machinery, guided missile and other volume-precision plants. IT MAKES PRECISION GAGING EASY . . . at machine . . . at inspection bench . . . for selective assembly. No other like it—investigate and see why.

COMTOR COMPANY

64 Farwell St.
WALTHAM 54,
MASS.

**GET THE FACTS—
REQUEST BULLETIN 49**



For more data circle 414 on Reader Service Card

The instrument is available with dual electronic amplification of either 1000/2000; 2500/5000; 5000/10,000 to 1. Amplifications within each dual range can be switched from one to the other without realignment of the indicating meter mechanism. With 5000/10,000 amplification, direct reading to ten millionths (0.000010) can be made on the graduated 4 inch zero center equilinear scale. According to the manufacturer, interpolations to five millionths can be made with unusual accuracy.

Both bench and floor type models are manufactured. An auxiliary cooling-off table (12 by 18 inches) for both gage blocks and work is available as an accessory with the floor model. Furthermore, this accessory has a bracket which is said to hold the gage block case at an easy-to-see and easy-to-reach angle.

Essentially, the instrument consists of a heavily serrated gage plate, vertically adjustable, on which the workpiece is placed. Gaging contact is provided by two vertical reed mounted gaging arms with diamond points



Wilson "Rockwell"** Hardness Testers



Why
WILSON ROCKWELL
means accuracy,
speed and economy
EVERYWHERE

8" Capacity
Rockwell Hardness Tester

WILSON field service experts help make sure that—

You Get the Hardness Tester You Need

Whether your hardness tester is required for use in laboratory, tool room, inspection department or on the production line.

Consultation is as Close as the Phone

A WILSON expert is never more than a few hours away to assure

perfect operation of your WILSON equipment.

You Get Prompt Service if You Need It

WILSON owners can count on WILSON prompt service to make sure that their equipment is always in top working order.

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ACCO



Wilson Mechanical Instrument Division
AMERICAN CHAIN & CABLE

230-G Park Avenue, New York 17, N. Y.

For more data circle 415 on Reader Service Card

January, 1957

modern machine shop 265

for
Better
Value

new shop equipment . . .

which are elevated into the workpiece. The gaging arms are set to the dimension to be checked with gage blocks.

The electronic gaging system has an "Electrojet" transducer type pickup unit connected to a remote "Accu-

tron" amplifier. The pickup unit is actuated by the gaging arm assembly as it is elevated into the workpiece. The "Electrojet" unit requires no pickup calibration, and the same unit can be used with all amplifications.

The "Accutron" amplifier has an electronic circuit which is claimed to be unaffected by line voltage fluctuations from 65 to 150 volts. Indicator response is instantaneous and readings are consistently repetitive. Power requirement is 110 volt, 60 cycle, a.c. The amplifier can be obtained with an optional outlet for connecting a meter reading recorder or other types of instruments.

For more data circle 106 on Reader Service Card



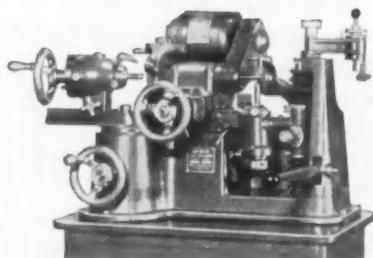
HYDRAULIC AUTOMATIC POLISHING MACHINE

The Curtis Machine Division, The Carborundum Co., Jamestown, N. Y., recently introduced the Model 43-R3 Hydraulic Automatic Stroke Polisher, which will polish either 2B roll mill sheets or formed flat surfaces to an equivalent No. 4 finish or better.

The Model 43-R3 employs a hydraulic system which powers a traveling head at 80 to 90, eight foot strokes per minute, with longer strokes possible. A buff roll mounted on the traveling head backs up the 6 inch

HYBCO TAP GRINDER

Sharpens Chamfers, Flutes
and Spiral Points



MODEL 1100

- Capacities No. 0 Machine Screw to 1½" Hand Taps.

HENRY P. BOGGIS & CO.
708 E. 163rd St., Cleveland 10, Ohio

For more data circle 417 on Reader Service Card

266 modern machine shop

C A M S

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC.
23-16 44th Road Long Island City 1, N. Y.

For more data circle 418 on Reader Service Card

January, 1957

Get the complete, revealing

Inside Story

on the finest
tapping heads ever made!

Here's a feature by feature analysis on the amazing Procurler tapping line which clearly explains why they have consistently maintained tapping superiority in the industry for over 30 years! A true "peep-hole" story on the many outstanding construction improvements, the mechanical advancements and precision quality operating advantages that make Procurler heads a "must" in production plants everywhere! You'll learn why Procurler means more tapping hours with a minimum of "down-time" interruptions, accelerated production with fewer broken taps, fewer spoiled pieces and a "new-found" operating ease and convenience that helps operators maintain stepped-up production schedules. "Do more tapping, better, for less" is the slogan in progressive plants who have adopted Procurler heads in their tapping departments.

*
**Find out how you, too, can benefit
with Procurler — Write for Free
Brochure Today**

PROCUNIER SAFETY CHUCK COMPANY

12 S. CLINTON ST., DEPT. 1
CHICAGO 6, ILL.

For more data circle 419 on Reader Service Card

January, 1957

PROCUNIER SAFETY CHUCK CO.

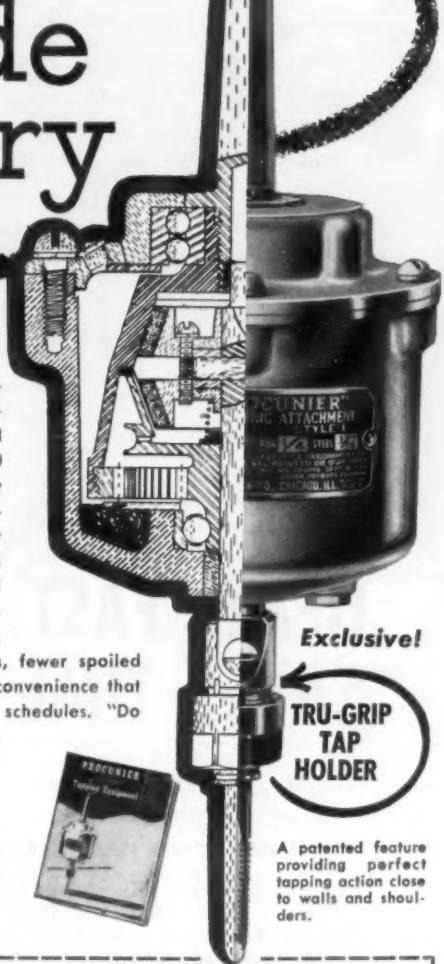
12 S. Clinton St., Chicago 6, Ill., Dept. 1

Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procurler High Speed Tapping Heads.

Name _____

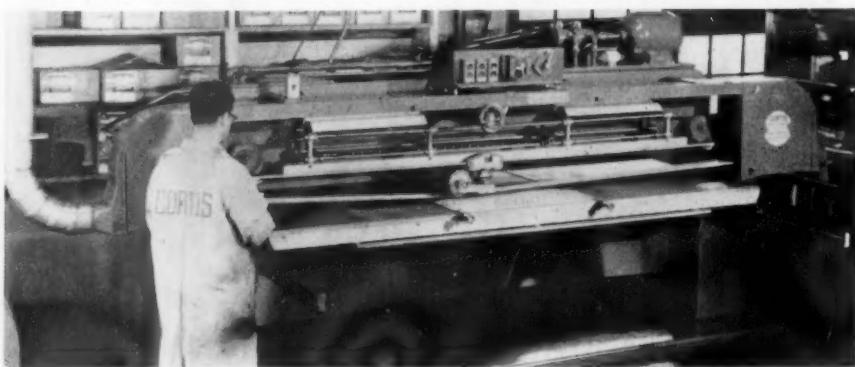
Address _____

City _____ Zone _____ State _____



A patented feature
providing perfect
tapping action close
to walls and shoulders.

new shop equipment . . .



View Showing Curtis Model 43-R3 Hydraulic Automatic Stroke Polishing Machine

wide abrasive belt with a "soft" pressure that is said to give a uniform finish. The stock table reciprocates un-

der the belt with grind pressure, either by manual or air pressure control.

According to the manufacturer, the

★ ★ ★ ★

HEATS FAST SAVES TIME

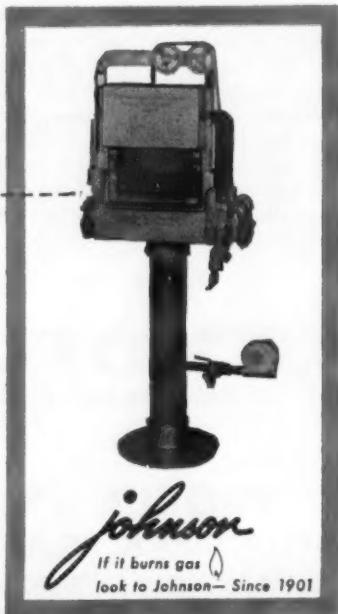
johnson
NUMBER 142 HEAT TREATING FURNACE

Powerful burners in this efficient furnace get heat up to the 1300°-2350° F. range in minutes. Temperatures accurately and quickly regulated. Does fast job with high speed and carbon steels. Ratchet-operated door opens upward. High temperature, refractory-lined firebox is 7" by 13" by 16½". 200,000 BTUs per hour. Carbon-frax hearth, G.E. Motor and Johnson Blower included, F.O.B. Factory\$337.00

Write today for free Johnson Catalog

JOHNSON GAS APPLIANCE COMPANY
571 E Avenue NW, Cedar Rapids, Iowa

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USE

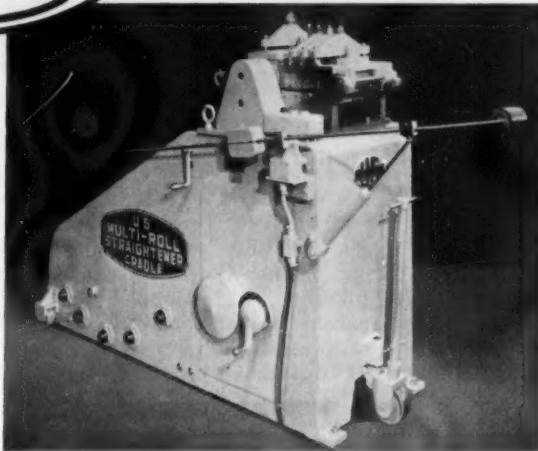


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PRESS-
ROOM
COSTS**

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- Slide Feeds
- Roll Feeds
- Stock Straighteners
- Stock Reels
- Stock Oilers
- Coil Cradles
- Wire Straighteners
- Die Sets
- Multi-Slides®
- Multi-Millers®

Model PDSC-940 (Portable)
Capacity: Material up to 9" wide x $\frac{1}{8}$ " thick. Coils with O.D. up to 40". Also made in other sizes.



Don't allow inefficient operations to devour your profit margin. U. S. Automatic Pressroom Equipment is designed and built to help you effect savings in the production of stampings.

The use of coil stock in press operations generally results in the need for a Straightener and a Coil Holder. On operations of this type you can improve efficiency, and at the same time conserve valuable floor space by using a U. S. Combination Coil Cradle and Power-Driven Straightener of the type illustrated above.

Your inquiries are invited. Ask for Bulletin 100-S.

U. S. TOOL COMPANY, INC.

AMPERE (East Orange)

NEW JERSEY

For more data circle 421 on Reader Service Card

January, 1957

modern machine shop 269

new shop equipment . . .

machine can be built to accommodate any length or width capacity. It can also be used for weld removal, surface cleaning prior to painting, scale removal, filler sanding and many additional operations.

For more data circle 107 on Reader Service Card

★ ★ ★

PLASTIC PACKAGE FOR CARBIDE THROW-AWAY INSERTS

In order to meet industry's need for a package providing better carbide protections, quick identification and easy use, Vascoloy-Ramet Corp., 860 Market St., Waukegan, Ill., has engineered a transparent plastic package for its V-R throw-away carbide inserts for toolholders. The package provides



V-R Plastic Package for throw-away inserts

instant identification as to insert style, carbide grade and quantity. It is simple to handle, easily opened and closed. Fumbling, dropping, carbide chipping and breakage is said to be reduced to a minimum. The package is rigid and durable, and inserts never touch each other.

This new plastic package is easy to store, taking less drawer or shelf space

Commander **TAPPER**

- Wider Range . . . 1 Tapper Handles No. 0 to 3/4" Taps
- Automatic Tap Protection
- Furnished to fit any Drill Press

Commander — "The Tapper That Thinks For Its Operator," has the adjustable full range torque control that instantly stops any tap when it becomes dull, loaded, strikes a hard spot or bottoms in blind hole tapping. Assures maximum tap protection, higher production, even with inexperienced operators.

Your nearby Commander Distributor can give you a demonstration in your own plant. Write for his name and a copy of the NEW Commander Full Line Catalog.

COMMANDER MFG. CO.
4224 W. Kinzie St.

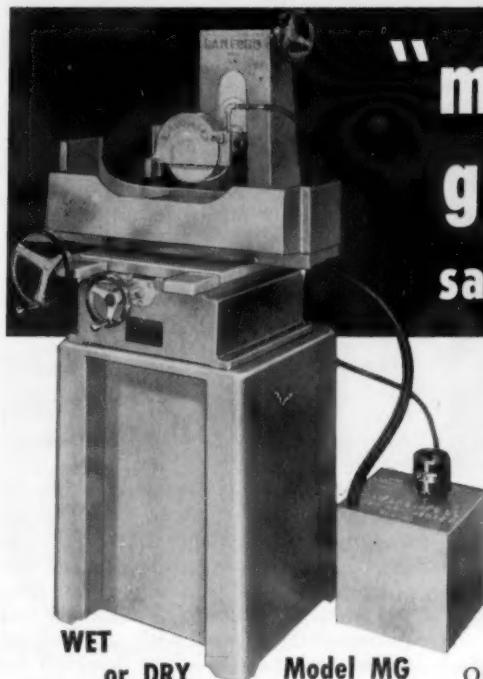
Chicago 24, Ill.



**Any operator
does precision
tapping with
a Commander
TAPPER**

Product of Commander . . . Builder of the Multi-Drill

For more data circle 422 on Reader Service Card



"most used grinder" say customers

In checking with the tool, die, gage and general production shops that use SANFORD SURFACE GRINDERS, the most frequent comment was that Sanford Grinders were the "most used" of any grinders in the shop.

PARTIAL SPECIFICATIONS—

Capacity — 8" x 12" x 12".
Table travel — 13", traverse 8½".
Vertical clearance 12" under 7"
wheel.
Standard grinding wheel — 7" x ½",
1¼" hole.
Spindle speed approx. 3000 RPM.
Motor, ½ HP, single or 3 ph., dynam-
ically balanced.
Floor space — 45" x 38" x 62" high.
Net wt. with stand approx. 630 lbs.

Others have tried to copy but there's a "feel" that comes from the precise individual quality and workmanship that goes into every SANFORD GRINDER. It's the factor that can't be found in any other grinder.

So widely used you can ask users in your own area how they like the low priced Sanford Surface Grinder.

Write for illustrated and fully descriptive literature, reconditioning facilities, optional equipment and prices.

Representatives in major industrial areas

SANFORD MANUFACTURING CORP.
1022 Commerce Ave., Union, N. J.

For more data circle 423 on Reader Service Card

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BROADMASTER VISUAL CONTROL

- ★ Gives Graphic Picture — Saves Time, Saves Money, Prevents Errors
- ★ Simple to operate — Type or Write on Cards, Snap in Grooves
- ★ Ideal for Production, Traffic, Inventory, Scheduling, Sales, Etc.
- ★ Made of Metal. Compact and Attractive. Over 100,000 in Use.

Complete price \$49.50 including cards

FREE

24-PAGE BOOKLET No. MS-30
Without Obligation

Write for Your Copy Today

GRAPHIC SYSTEMS

55 West 42nd Street • New York 36, N. Y.

For more data circle 424 on Reader Service Card

272 modern machine shop

new shop equipment . . .

than other style packages. Inventories are simplified also — contents of the package are clearly visible through the transparent bottom for quick identification and count.

For more data circle 108 on Reader Service Card

★ ★ ★

FOUR-WAY AIR VALVES

The A. K. Allen Co., 57 Meserole Ave., Brooklyn 22, N. Y., has added three new models to its established Allenair line of $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$ inch air valves.

These four-way valves are available as single solenoid or for foot or cam operation. The single solenoid valves are of air-return principle and no springs are used in their construction. All friction surfaces are hardened and permanently coated with a baked-on lubricant. The valves are designed for operation from 5 to 150 p.s.i. and the solenoid valves are said to reciprocate at the rate of 800 strokes per minute. Two speed controls are built-in to provide full control of the cylinder piston in both directions.

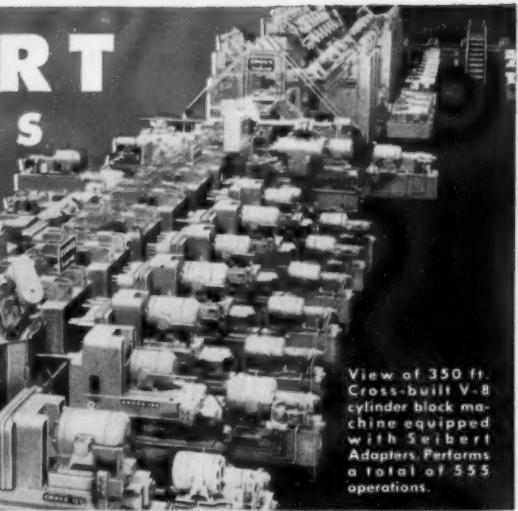
For more data circle 109 on Reader Service Card



Three models of the Allenair Four-Way Valve

January, 1957

SEIBERT ADAPTERS



View of 350 ft.
Cross-built V-8
cylinder block ma-
chine equipped
with Seibert
Adapters. Performs
a total of 555
operations.

"Meet Our Standards Completely"

CHECK THESE SEIBERT FEATURES

- Designed with convenient starting ring for easy installation.
- Relieved key seat eliminates swell, assures easier setups.
- Manufactured to GMC, Ford, Chrysler & ASA standards.
- Lot produced, economically priced.



New Tool Control Board—individually designed to suit your needs.



WRITE FOR ADAPTER BULLETIN, LATEST PRICE LIST

Ask for Folio 2-50. Gives complete specifications. Lists range of sizes available from stock. Ask also for brochure illustrating new control boards and complete line of holding tools.



800 Series
Spindle
Extension



900 Series
Spindle
Extension



Compression
or Tension
Tap Driver



Floating
Holder

SEIBERT & SONS, INC. 1001 E. 24th STREET

CHENOA, ILLINOIS

Quality MULTIPLE DRILL SPINDLES AND PRODUCTION TOOLS

SEIBERT

For more data circle 425 on Reader Service Card

January, 1957

modern machine shop 273

new shop equipment . . .

REVOLVING FORK TRUCK

An electric truck with revolving forks has been designed by The Raymond Corp., 88-147 Madison St., Greene, N. Y., to serve a dual purpose. The revolving feature allows small parts to be dumped from steel

"LITTLE BLACKSMITH"
No. 48 NOTCHER

ALL STEEL CONSTRUCTION
UNBREAKABLE

PRICE
\$58.00
with one set
of dies.

Capacity
1/8" material.
Any angle up to
90°. 1" deep.

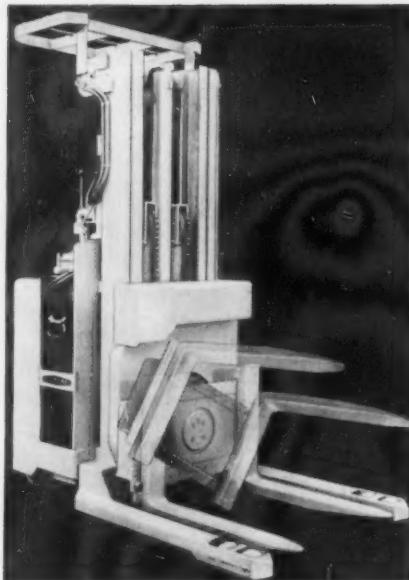
Wt. — 18 lbs.
Bench space
6" x 4"

Sheet metal
notches up to
9" x 9"

Send us a sketch of your notching problems. Undoubtedly we have a machine or can make one for the operation. It will enable you to get the order.

MANUFACTURED BY
J. F. KIDDER
Manufacturing Co. Inc.
446 Colchester Avenue
Burlington, Vermont

For more data circle 426 on Reader Service Card



Raymond Electric Revolving Fork Truck

boxes into hoppers. When the forks are in a normal position the truck is used to stack boxes in storage areas. A hydraulic motor powers the revolving mechanism through a chain driven sprocket and gear reduction. The forks move in a continuous 360 degree arc in both clockwise and counter-clockwise directions. Movement of the forks is controlled by means of a hand operated hydraulic valve.



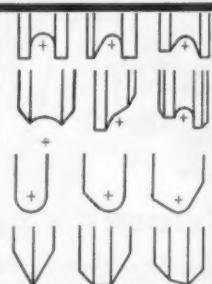
WHY WASTE TIME?

Dress Profiles like these in a few minutes without Templates or Crusher Rolls with the Jeon Automatic Angle Tangent to Radius Dresser. It's fully universal.

Patented

Write for Price and Folder.
Representatives Wanted.

JEON MANUFACTURING CO.
P. O. BOX 6750 WASHINGTON 20, D. C.



For more data circle 427 on Reader Service Card

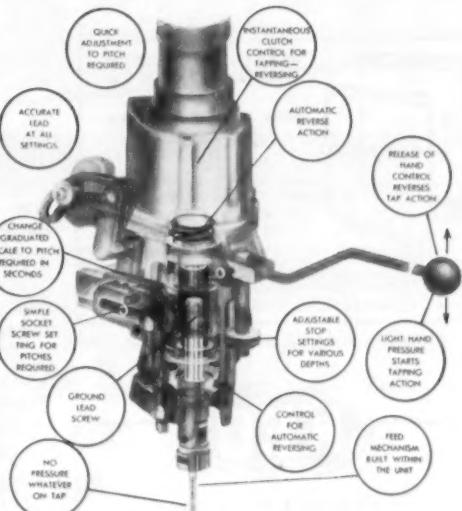
NEW *Jarvis* adjustable pitch

**2 models . . . Convertible to 11, 12,
13, 14, 16 18, 20, 24 and 28 pitch . . .
24, 28, 32, 36, 40, 44, 48, 56, 64, 72 and
80 pitch . . . in SECONDS!**

**LEAD SCREW
TAPPER!**

Now, one attachment, one lead screw with quick simple adjustment gives convertible tapping in Seconds! Through positive leverage and clutch control, one lead screw running at constant speed, makes these new adjustable pitch lead screw tappers a must in every tapping department.

This is production economy—saves the cost of the individual lead screws for each pitch desired. Saves change over time—converts in a few seconds—by adjustment of four setscrews along a clearly marked graduated scale.



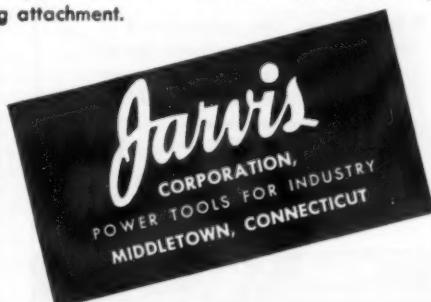
Tap with a feather touch on hand control . . . no pressure on the tap. Stops cut at end of predetermined depth. Automatically reverses upon release of hand control, automatically backs out, leaving clean, accurate threads.

Now, convertible pitch tapping, faster production, new versatility is assured even by unskilled operators—with this single tapping attachment.



WRITE NOW!

Send for bulletin
and prices.



For more data circle 428 on Reader Service Card

new shop equipment . . .

Oil pressure to operate the revolving fork arrangement is developed by a single motor and pump, which also furnishes power for the hydraulic lifting arrangement. The entire assembly is said to be very compact and does not detract from the efficiency of the

truck which is especially designed to operate in narrow aisles. The device can be installed on any 4,000 lb. capacity Straddle Truck made by the manufacturer.

For more data circle 110 on Reader Service Card



BORING TOOL RESHARPENING FIXTURE

The addition of resharpening fixtures to its line of precision tools and tool accessories has been announced by Bokum Tool Co., Inc., 14775 Wilmere Ave., Detroit 38, Mich. Designed for resharpening boring tools of Bokum design only, the new fixtures are said to provide a fast, accurate means of maintaining tool efficiency, prolonging tool life. Proper resharpening requires that correct rake angles be maintained and that grinding be restricted to the top surface of the tool only.

Features of these fixtures are as follows: compound angles required for resharpening built into fixtures permitting setup simply by placing fixture on magnetic chuck of surface grinder; a diamond dresser guide for setting grinding wheel at exact height at which tool edge should be ground; a carbide-tipped stop for locating tool in proper position for grinding.

Both fixtures are for use on Bokum Style A and B boring tools only. Fix-



WADE ENVELOPES

protect

Shop Orders, Drawings,
Blueprints, Etc.

Two styles. No. 2 with fibre back, No. 3 transparent both sides. Non-inflammable acetate windows. Special style or size to order.

Write for details.

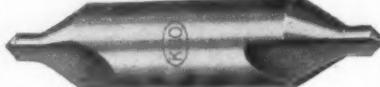
WADE INSTRUMENT COMPANY

Dept. M, R.P.D. No. 1, Chardon, Ohio

For more data circle 429 on Reader Service Card



COMBINED DRILLS



and COUNTERSINKS

• Both old and new series carried in stock for immediate delivery. Finest high speed steel. Ground spiral flutes. New standard simplifies and improves size progression. New comparison chart mailed on request. Shows new standard sizes—both plain and bell type. Specials to your blue prints.

KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

For more data circle 430 on Reader Service Card

Magnetic Base Indicator Holders



Stainless holding
rod set in ball
socket

Precision
adjustment
like surface
gauge

Erick

Magna Holder
Model 200B
Only \$5.45

See your dealer or write for
catalogue 755 on the most
complete line of magnetic
base units & access. mfg'd.



Powerful
50 lb. pull base

CULLEN MFG. CO., RACINE, WIS.

For more data circle 431 on Reader Service Card

TOUGH

and Flexible . . . the combination that means Longer Life, Lower Costs!

SIMONDS
"Red End"
HACKSAW BLADES
(Hard Edge)

Simonds "Red End" Hand Blades are TOUGH AND FLEXIBLE! We make 'em of Simonds Cross-Rolled Steel for quick and easy cutting and *longer life*. SIMONDS CROSS-ROLLED PROCESS PROVIDES THE TOUGHEST GRAIN STRUCTURE FOR MAXIMUM RESISTANCE TO WEAR AND ABUSE.

Simonds offers three types of quality blades to do specific cutting jobs faster, easier, straighter: STANDARD STEEL for general all-around use; HIGH SPEED MOLYBDENUM for longer wear and dependable service; HIGH SPEED TUNGSTEN for best results in cutting tough alloy steels. Furnished in all standard lengths and tooth sizes for specific applications. All-Hard Blades are also available for those who prefer a rigid type blade. Make your hacksaw dollars go farther with Simonds "Red End" Blades.

For Fast Service from Complete Stocks Call your
SIMONDS
Industrial Supply
DISTRIBUTOR

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y., Heller Tool Co., Newcomerstown, Ohio, Simonds Abrasive Co., Phila., Pa., and Arville, Que., Canada.

For more data circle 432 on Reader Service Card

new shop equipment . . .



View showing Bokum Resharpening Fixture

ture AB-1 is for resharpening tool sizes to No. 0.00000 to No. 3. Fixture AB-4-12 is for tool sizes No. 4 to No.

12. Both fixtures are designed to assure proper resharpening procedures. For more data circle 111 on Reader Service Card

★ ★ ★

POWER SAW BLADE RESHARPENING SERVICE

A new method of sharpening power hack saw blades on special precision machines, that is claimed to afford new blade life even on the third and fourth regrind, has been announced by Peerless Tool, Inc., 38 Peck St., North Attleboro, Mass. This service provides for the return of the blades with sharp, square and uniform teeth without affecting set or temper. Resharpened blades are currently being used for successfully cutting stainless, titanium and all other metals in small job shops and large production shops. For more data circle 112 on Reader Service Card

HOW ARE YOU FIXED FOR BOXES?

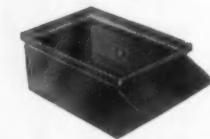
Finding a place for production parts can be inconvenient and time consuming when boxes are unavailable.



For the best steel stacking box, its Sterling—its top rim construction makes it best.

Sterling makes all types and sizes of steel boxes.

**STERLING
FACTORY EQUIP. CO.
183 Charles St.,
Providence, R. I.**



Sterling
Quality Handling & Storage Equipment



For more data circle 433 on Reader Service Card



BOKUM TOOL USERS

NOW!

**BOKUM OFFERS SERVICE
AFTER SALE OF BORING TOOLS**

Factory-sharpened Bokum boring tools every time you resharpen . . . that's what you get with your Bokum boring tools. You can maintain that extra precision over the lifetime of the tool with Bokum's new, low-cost Resharpening Fixtures . . . AB-1 for tool sizes No. 00000 to No. 3, AB-4-12 for sizes No. 4 to No. 12. They're easy to use, too. Compound angles required for correct resharpening are built into the Fixtures. A diamond dresser assures exact grinding wheel setting and a carbide-tipped stop locates the tool in proper position for grinding. Keep your tools factory fresh indefinitely.



TRADE MARK REG. U. S. PAT. OFF.

Write Dept. B for Catalog Sheets
AB-1 and AB-4-12 TODAY.

BOKUM TOOL CO. INC. 14775 Wildemere Ave.
Detroit 38, Mich.

For more data circle 434 on Reader Service Card

new shop equipment . . .

LOW HYDROGEN, IRON POWDER ELECTRODE

The Lincoln Electric Co., Cleveland 17, Ohio, has announced an all-position, low hydrogen, iron powder type electrode called Jetweld LH-70. It is an electrode for general purpose welding of all steels with high currents and for welding crack-sensitive steels

and steels tending to produce porosity in weld metal. It has the usual low hydrogen advantages, plus those of iron powder electrodes: high deposition rate, easy slag removal and unusual operating characteristics. Typical uses of the electrode are for welding low alloy steels, which must be welded without preheat, high sulphur-free machining steels, steels to be annealed, medium to high carbon steels and thick metal sections.

According to the manufacturer, iron powder in the coating produces deposition rates which result in welding speed 10 to 30 per cent higher than those obtained with low hydrogen electrodes without iron powder. The coating produces greater footage per electrode and, therefore, necessitates fewer electrode changes.

Ease of operation is claimed to be characteristic in all positions with either d.c. electrode positive or a.c. welding current. Bead appearance is smooth and clean, spatter being reduced to a minimum. Slag is easily removed. Either a drag technique or a short arc technique can be used.



Yes, you could compare the delicate but firm technique of the Labrador Retriever with the strong but accurate diaphragms in N. A. Woodworth chucking equipment.

Your best machine will produce only as accurately as its work-holding device permits and Woodworth manufactures the most rugged, accurate and dependable chucks for precision machining in America.

We invite your inspection and consideration of Woodworth chucking equipment.

- Standard Diaphragm Chuck
- Air-Operated Diaphragm Chuck
- Bevel Gear Chuck
- Double Diameter Gear Chuck
- Finger Chuck
- Air-Operated Diaphragm Arbor
- Push-Lock Arbor
- Twist-Lok Spline Arbor
- Tork-Lok Collet Arbor
- Zero Spindle Inspection Fixture

WOODWORTH

**1300 EAST NINE MILE ROAD
DETROIT 20, MICHIGAN**

For more data circle 435 on Reader Service Card

WHICH WHEEL...

Helps YOU most?

Each of these Multi-Use "Brightboys"
Gives a Completely New Slant on
Abrasive Applications

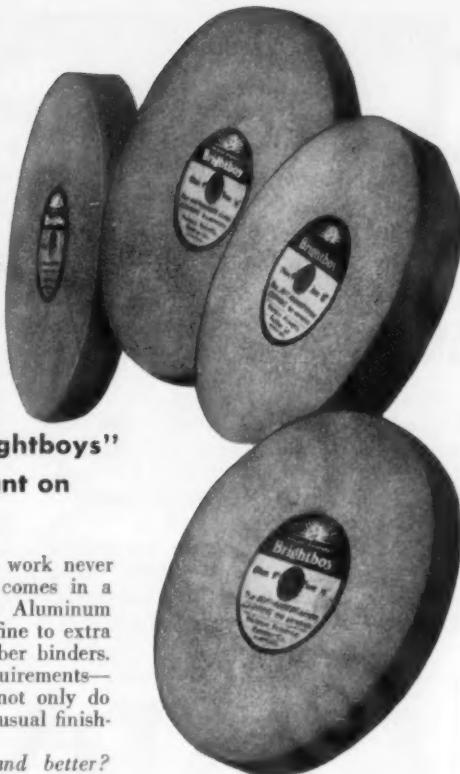
These new wheels will perform types of work never before associated with abrasives. Each comes in a wide selection of Silicon Carbide and Aluminum Oxide grains—each in grains from extra fine to extra coarse—each in soft, firm and tough rubber binders. Here are wheels exactly suited to your requirements—readily available STOCK numbers that not only do the work of "specials" but also countless usual finishing jobs.

What's Brightboy got that's different and better?

PLENTY! The unique combination working-action of **abrasive and rubber**, that will **BURR, FINISH, CLEAN, POLISH IN ONE OPERATION; save as much as 50% in time!**

Practically limitless applications. Applications you may never have associated with abrasives.

Ask your dealer to recommend the Brightboy grain and texture ideally suited to your jobs. Ask him for the Brightboy Catalog listing grains and textures, applications, machine speeds, work suggestions. Write us if he cannot supply you or on any problem in which finishing is involved.



BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.
95 North 13th Street • Newark 7, N. J.
America's Pioneer Manufacturer
of Rubber-Bonded Abrasives

For more data circle 436 on Reader Service Card

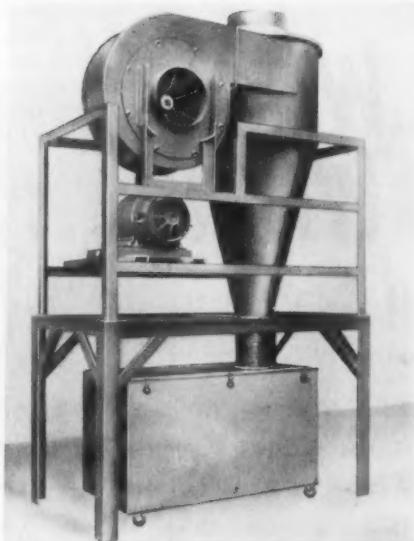
new shop equipment . . .

The electrode is classified as an A.S.W. E-6016, but it also meets the requirements of classes E-6015, E-7015 and E-7016. It is available in $\frac{1}{8}$, $\frac{5}{32}$, $\frac{3}{16}$, $\frac{7}{32}$ and $\frac{1}{4}$ inch sizes.
For more data circle 113 on Reader Service Card

★ ★ ★

COLLECTOR FEATURES ROLL-AWAY DUST COLLECTING BIN

Aget Manufacturing Co., 1398 Church St., Adrian, Mich., has announced an addition to its line of Dust and Mist Collectors. This unit, known as the 90 NB 50, is designed for use in grinding, buffing, woodworking and miscellaneous operations where a large volume of dust, chips, shavings and other residue accumulate from manufacturing processes.



Aget 90 NB 50 Dust and Mist Collector

MARVECO

LIVE CENTERS

WITH —

MARVECO low prices

MARVECO real precision

HOW CAN YOU AFFORD TO BUY ANY OTHER?

SEND FOR CATALOG AND PRICE LIST

MARVEL TOOL & MACHINE CO.
1092 NO. RIVER ROAD

ST. CLAIR, MICH.

For more data circle 437 on Reader Service Card

Accuracy $\pm .000008''$
\$180.00
43 BLOCK SET



Specially selected sizes for the small shop or a standby set where additional blocks are a needed convenience.

Keep a second set with wanted sizes available on instant notice. Avoids delay or even error that might result from using substitute gaging methods.

The 43 Block Set (43 B) has accuracy of $\pm .000008''$ and must pass the same test for surface finish, flatness and parallelism of the finest grade of steel blocks.

Webber
GAGE BLOCKS
and ACCESSORIES

WEBBER GAGE COMPANY
12899 Triskett Road • Cleveland 11, Ohio

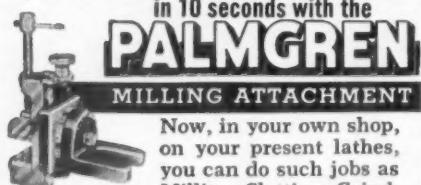
Largest exclusive manufacturer of
precision gage blocks

Send inquiries direct to Webber Gage Company

For more data circle 438 on Reader Service Card



**NOW...
you can
CONVERT
LATHES FOR
MILLING**



in 10 seconds with the

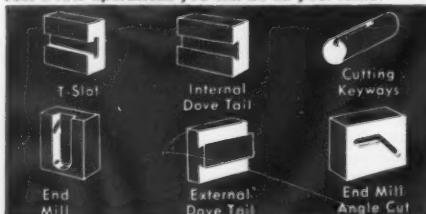
PALMGREN
MILLING ATTACHMENT

Now, in your own shop, on your present lathes, you can do such jobs as Milling, Slotting, Grinding, Grooving, Sawing

No. 250

at angles, recessing and many more complicated jobs easily and quickly with the Palmgren Milling Attachment. Yes, in just 10 seconds you can convert to any of these operations and save time and money doing work you formerly had to send out. Precision built, graduated for rotary angle and vertical adjustments, easily mounted on all makes of lathes by straddling tool post, this attachment has proved highly valuable in thousands of shops, both large and small. Three sizes: jaw widths 1½" \$18.75; 2½" \$24.75; 4" \$39.75. Available NOW! Get more out of your lathes by using these Palmgren Milling attachments. Write today.

Just a few operations you can do on your lathe!



CHICAGO TOOL & ENGINEERING CO.

8399 South Chicago Ave., Chicago 17, Illinois
For more data circle 439 on Reader Service Card

new shop equipment . . .

The special feature of the 90 NB 50 is the roll-away dust collecting bin, which has a storage capacity of 37½ cubic feet. This bin, made of heavy reinforced cold rolled steel, moves on large rubber-tired ball bearing casters. It can be pushed to the dumping spot or it can be pulled out from under the collector where a fork lift truck can handle it. The bin top is held in place by luggage type clamps and a flexible neoprene coated hose runs from the cyclone outlet to the bin lid. The lid is lifted upward automatically by springs when clamps are raised.

This collector has an air handling capacity of approximately 10,000 c.p.m. and uses a 15 h.p. motor. The fan inlet will accommodate 15 inch pipe. Overall dimensions are 48 inches deep, 82 inches wide by 124 inches high.

For more data circle 114 on Reader Service Card

★ ★ ★

**FURNACE FOR PILOT
PLANT OPERATIONS**

Lindberg Engineering Co., 2469 West Hubbard St., Chicago 12, Ill., has announced a special line of furnaces, designed for pilot plant operations requiring testing and determining proper methods and processes for heat-treating and melting of metals. This line of furnaces covers six units: an atmosphere box furnace 6 by 12 by 5 inches for continuous operation at 2,600 degrees F.; a box furnace 5½ by 7½ by 14½ inches with reactor control; a 3 k.w. high frequency induction furnace; a horizontal tube furnace; a vertical tube furnace 5 inches o.d. by 8 inches effective; and a high temperature pot furnace for operation to 2,500 degrees Fahrenheit. For more data circle 115 on Reader Service Card



still the winner
*... and in high speed steels,
nothing beats REX*

The winner and still champion after fifty years is Crucible's REX high speed steel. *And now it's better than ever!* Recent improvements in manufacturing processes have given even higher quality and greater uniformity to every one of its properties.

Why not shop test the new REX yourself? Test it for size, structure, response to heat treatment, fine tool performance. Give it any test you wish. You'll see why it is today, as it has always been — the standard by which all other high speed steels are compared.

Ask for REX by name at your local Crucible warehouse. Or order it directly for prompt mill delivery. And for information on REX, and the other Crucible special steels, send for the *Crucible Publication Catalog*. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

For more data circle 440 on Reader Service Card

January, 1957

modern machine shop 285

new shop equipment . . .

AIR GRINDER FEATURES IMPROVED MOTOR

Thor Power Tool Co., Aurora, Ill., has announced a lightweight 6 inch air grinder with an improved motor that is claimed to be 50 per cent more powerful than previous models. The tool is part of the company's new No.



Thor No. 4 Series 6 Inch Air Grinder

4 Series of industrial air tools. The 4G Series of air grinders is being produced in 12 models — four different

speeds and three different throttle types. It has fewer parts and has a five-blade type motor with a one-piece rotor and shaft. It supersedes the company's 250 Series.

The new model is available in speeds of 4,500, 6,000, 9,000 and 12,000 r.p.m. and comes in butterfly, grip and lever type throttles. Friction and vibration are said to have been reduced in the new models. Air exhaust also has been silenced to a minimum. Another feature in the latest models is a newly designed governor. It is a unit assembly, direct acting and tamper-proof governor equipped with an adjustable governor spring.



THIS WATER SOLUBLE CUTTING COOLANT STAYS MIXED

FISKE'S "MAGIC" COMPOUND, when dissolved in water, goes into a permanent emulsion . . . will never separate. It cools, lubricates and produces a high finish. Lengthens tool life. There's nothing so good for milling, drilling, grinding, turning, sawing, threading, wire drawing and stamping. Does not become rancid. Try Fiske's "MAGIC" Compound and see the improvement in your work.

Bulletins describing FISKE'S MAGIC COMPOUND and other specialty lubricants and coolants sent on request.



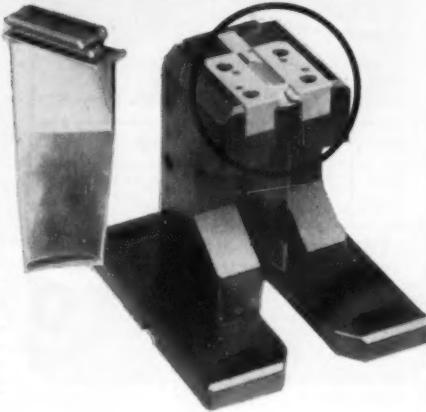
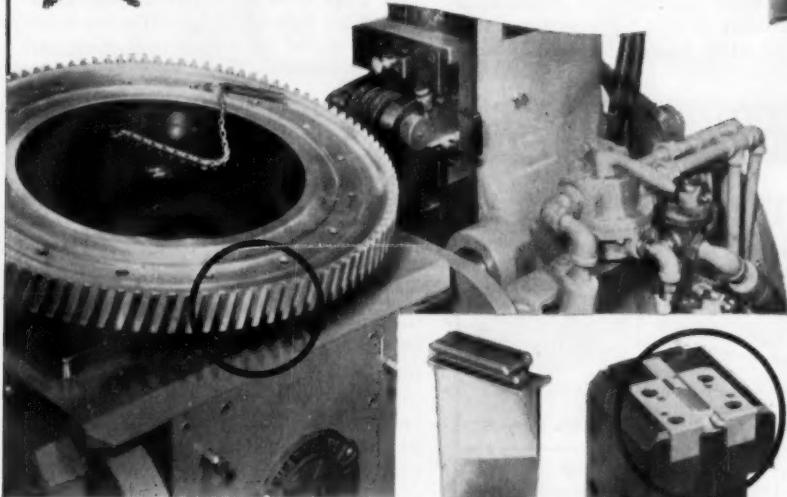
**METAL WORKING
LUBRICANTS**

FISKE BROTHERS REFINING CO.

Newark 5, N. J. and Toledo 5, Ohio

For more data circle 441 on Reader Service Card

IDENTITY ~~you~~ known



These two precision component parts require equally precision, perfectly legible marking on specially designed Matthews Machines for positive identification and assembly. Regardless of your product, let Matthews provide engineered, custom-built Marking Tools for every production rate.

MARKING TOOLS FOR MODERN INDUSTRY

Write for complete information

JAS. H. MATTHEWS & CO.

3944 FORBES STREET PITTSTURGH 13, PA.

CHICAGO • BOSTON • PHILADELPHIA • CLIFTON • JACKSONVILLE

For more data circle 442 on Reader Service Card

new shop equipment . . .

The 4GG Series grip type has a handle that is integral with the cylinder housing and employs a steel ball throttle valve. The 4GL Series lever throttle handle is made of aluminum with a rubber sleeve for positive hand grip. The 4GB Series button or but-

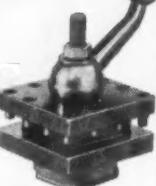
terfly type has an aluminum handle with longitudinal ridges for firm grip. Throttle valve seats in steel bushings are made of stainless steel to prevent rusting.

All throttle types have a steel reducer bushing for hose connections. The grip type also has an automatic mist type lubricator. In the lever and button types, oil is inserted manually. For more data circle 116 on Reader Service Card

**MANHATTAN'S MIRACLES!
TOP VALUE — LOWEST PRICE**

TURRET TOOLPOSTS

SAVE 33 1/3%



12 position indexing • Machineable base
Block can mount 4 different tools • 3 working
positions • Precision made in West. Germany

Model	Tool Block	Tool Range	Price
2 1/2"	2 1/2" x 1 3/8"	1/4" x 3/8"	\$16.00
3 1/2"	3 1/2" x 1 3/4"	3/8" x 1/2"	\$24.00

For tremendous savings, write for
circular listing sensational bargains.

MANHATTAN SUPPLY COMPANY
The Cutting Tool Discount House
151-A GRAND ST., NEW YORK 13, N.Y.
Telephone: CANal 6-4992

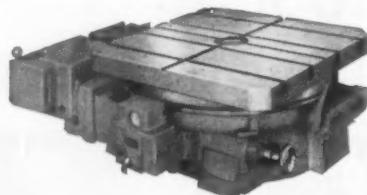
For more data circle 143 on Reader Service Card

★ ★ ★

GAGE BLOCKS HAVE ACCURACY AND PARALLELISM OF PLUS OR MINUS 0.000008 INCH

The Brown and Sharpe Manufacturing Co., Providence, R. I., has announced its Johansson "Thrift Blocks," that have an accuracy and parallelism of plus or minus 0.000008 inch with a surface finish maintained from 1.0 to 1.5 micro-inch R.M.S. The flatness is within 0.000006 inch. These blocks are called "Thrifty Jo's" and give Class B block accuracy.

Two sets of "Thrift Blocks" are available and cover the majority of shop measurements. Set No. 1 consists of 84 blocks which, in combination, are claimed to produce a half million different gage sizes. Set No. 2 includes 36 blocks which will produce over 150,000 different gage sizes. Each set is furnished in an attractive wood



FASTER set-ups and positioning

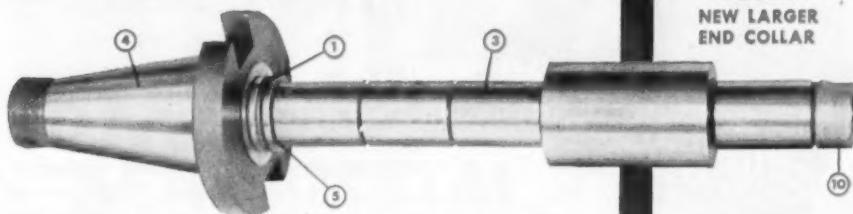
You save set-up and positioning time with Gilbert rotary tables. *Hand-indexing: 36" and 50" square or round. Power rotary and power feed: 36", 50", 60", and 72" square or round.* Special tables built to your requirements. For complete descriptions and specifications, write for Bulletin 854.

THE CINCINNATI GILBERT MACHINE TOOL COMPANY • CINCINNATI 23, OHIO

For more data circle 144 on Reader Service Card

EXCLUSIVE NEW FEATURES OF SCULLY-JONES ARBORS

give you extra-precision milling
at the same low cost!



These benefits	...for these reasons	...result from these PREMIUM features
PREMIUM ACCURACY	No "cocking" of spacers when "snubbed up" on arbor.	1. New, larger end bearing and collar insure perfect alignment; 45 deg chamfer in collar for clearance over fillet. 2. Bore and outside diameter of bearing sleeves concentric within .0005 in.; faces of sleeves and collars parallel within .0002 in.
PREMIUM TOOL LIFE	No runout, each tooth of cutter takes its share of the load.	3. Arbor and pilot diameter held to plus .0000, minus .0005 in. with .0005 in. minus tolerance. 4. Taper held within .0002 in., with 10-20 micro-inch finish. 5. New, larger size and grooved OD make it easy for operator to identify end collars, help to prevent mistakes.
PREMIUM PRODUCTION	Reduce down-time. Reduce setup time.	6. Keyways standard in all sleeves and collars. Can be keyed to arbor to prevent rotation. 7. True-running arbor helps eliminate premature cutter failure. 8. Adjustable spacing collar speeds adjustment between gang mills and saws.
PREMIUM ARBOR LIFE	Accuracy lasts longer. Fortified against breakage under heavy loads.	9. Forged steel arbors hardened throughout to 42-45 Rockwell, "C". Sleeves hardened on OD and faces to 60 Rockwell, "C". Collars hardened throughout to 40-45 Rockwell, "C". 10. Hardened and ground threads for arbor nut. 11. New, larger fillet increases strength at stress point between arbor and shank.

Call your Scully-Jones factory-trained representative or distributor for complete information and prices.

PRECISION HOLDING TOOLS
"Precision Holding" for holding precision

Scully-Jones and Company, 1909 South Rockwell St., Chicago 8, Ill.

For more data circle 445 on Reader Service Card

January, 1957

modern machine shop 289



NEW LARGER
END COLLAR



PRECISION
BEARING
SLEEVE



SOLID AND
ADJUSTABLE
SPACING
COLLARS



SHELL END
MILL ARBORS

new shop equipment . . .



Johansson "Thrift Block" Set Number 1

case with spaces provided for wear blocks, also a chamois cloth for wiping the blocks prior to use. "Thrift Blocks" may be purchased individual-

ly when desired and chromium carbide wear blocks are available.

For more data circle 117 on Reader Service Card

★ ★ ★

7/16 INCH BAR AUTOMATIC

The National Acme Co., 183 East 131st St., Cleveland 8, Ohio, recently announced its 7/16 Inch RA-6 Multiple Spindle Bar Automatic. This machine was developed especially for the manufacture of small, high-production parts. Included in the special tooling applications are the usual second operation attachments for threading, reaming, pickup and back burr, milling and cross drilling.

An outstanding advantage of the 7/16 Inch-Six is its small size. The machine measures approximately five feet high, 5½ feet long (16 feet including the stock reel), and has the

SAVE TIME & MONEY
with **STANDARD
CIRCULAR FORM
TOOL BLANKS**

SAME DAY SHIPMENT

- # 00 B&S through 1" wide
- # 0 B&S through 1¼" wide
- # 2 B&S through 1½" wide

plus Davenport Form Tool, Sizing and Roll Blanks through 1" wide.

All by 16ths in High Speed Steel.

somma TOOL CO., INC.

20 BROWN STREET, WATERBURY, CONN.
West Coast Warehouse: 576 N. Prairie, Hawthorne, Calif.



Write for complete price list and name of local representative. Complete line of Standard Circular Form Tools available—ask for catalog. Price and delivery on request for Blanks for other make machines or Blanks of High Cobalt Steel.

For more data circle 446 on Reader Service Card



Kendex* multiple grooving tool, with 12 Kennametal "turnover" button inserts, and shims of Kennametal for fast groove cutting and rapid, accurate indexing

KENNAMETAL* Tooling for Special Jobs

Kendex principle is adaptable to a wide variety of job requirements

Many machining jobs often can be done better, faster, or at less cost with a new cutting tool . . . or a tool that is adapted to the existing conditions. These photographs show Kendex* Tooling redesigned for specific jobs.

Experienced Kennametal engineers will work with you to find the best approach to your metal-cutting problems. Often a modified standard tool is the answer. Sometimes an entirely new approach with specialized tooling may be the only solution to improve production. In either case, the chances are that Kennametal's experience during the last 18 years has solved a similar problem. Result: Time is saved, development work is reduced to a minimum and basic design has been proven.

If you have a stubborn, high cost production job, perhaps your Kennametal tool engineer can quickly suggest a solution. He devotes his time exclusively to tooling problems with one objective—to get the right tool and right grade of Kennametal on the job. His broad experience in tool design and

Boring bar utilizing Kendex clamped-holder principle and Kennametal triangular inserts of the "turn-over" throw-away type . . . eliminates grinding . . . reduces downtime.

Facing and chamfering completed in one pass with a two-in-one Kendex Tool and Kennametal inserts. Since only the middle of chamfering insert is used, inserts may be interchanged after use, thus doubling the number of cutting edges for both operations.



tool application is supplemented by that of our Research and Engineering staffs. They provide the best tools and most practical techniques for metal-cutting and forming operations. Call your Kennametal Representative or write to KENNAMETAL INC., Latrobe, Pa.

*Trademarks

B-11404A

INDUSTRY AND
KENNAMETAL
...Partners in Progress

For more data circle 447 on Reader Service Card

new shop equipment . . .

working position high enough so that the operator or set-up man can work in an erect and comfortable stance. Like all Acme-Gridleys, the 7/16 Inch-Six features ample room for adjustment and tool changes in an "open" tooling zone.

The machine is arranged for spindle speeds up to 4,500 r.p.m. in stand-

ard models and up to 3,200 r.p.m. in models equipped with spindle stopping mechanism. Although the spindle capacity is 7/16 inch using standard collet and pusher tubes, it can be increased when necessary by using combined pushers and pusher tubes to accommodate $\frac{1}{2}$ inch round or 7/16 inch hexagonal stock.

The toolslide of the machine is of the standard Acme-Gridley flat surface design with center keyway and parallel tee slots for holding down the hinge-type toolholders, that are furnished at each spindle station, allowing the use of any standard type of end-working tools, as well as special toolholders of various design for operations requiring recessing attachments, and other units.

NEW!
NOSE ADJUSTMENT
for
GREEN
master feed fingers
designed especially for
the multiple spindle
screw machine

The new design makes it possible to adjust the fingers at the machine. The nose cap can be easily removed and tension of the fingers loosened or tightened with a minimum of lost time. Synthetic rubber inserts grip any size or kind of bar stock and protect it from scratching or scoring. Tension is uniform . . . prevents distortion when thin-wall tubing is used. Simple construction eliminates maintenance.



Catalog sheet and
price information fur-
nished on request.

GREEN MANUFACTURING CO.
122 S. PRAIRIE AVE. • ROCKTON, ILLINOIS

For more data circle 448 on Reader Service Card

**YOU GET more* WHEN
YOU BUY BEARINGS FROM
YOUR **Bunting**
DISTRIBUTOR**



***more availability**

IN A MATTER OF MINUTES—at any time—wherever you are—you can get a few or thousands of completely finished Stock Bearings and Bars made of Bunting Cast Bronze or Bunting Sintered Powdered Oil-filled Bronze. All over America Bunting distributors carry ample stocks of these highest quality products made in both of the two universally popular metals, backed by Bunting's long experience and established responsibility.

Your Bunting distributor is listed in the classified section of your directory usually under Bars—Bronze, and Bearings—Bronze. Two modern Bunting factories and eleven Bunting Branch Warehouses expedite distribution in all areas. Write, or ask for catalogs giving complete dimensional listings and technical data.

All Bunting Sintered Bronze Bars are machined to size on OD for quick and true chucking; the size is stamped the full length of the bar. Both are exclusive Bunting features.



Bunting

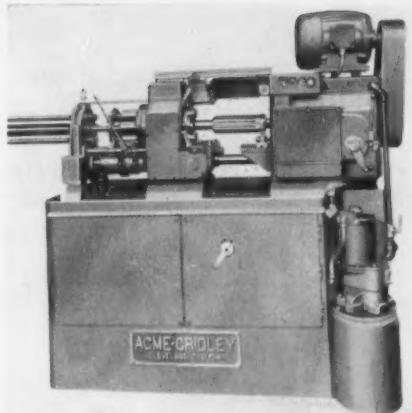
**BUSHINGS, BEARINGS,
BARS AND SPECIAL PARTS
OF CAST BRONZE AND
POWDERED METAL.**

The Bunting Brass and Bronze Company • Toledo 1, Ohio • Branches in Principal Cities
For more data circle 449 on Reader Service Card

new shop equipment . . .

ground and mounted in hardened and ground bases. Arrangement has been made for independently operated auxiliary side slides in both the second and fifth positions. The fifth position slide is standard equipment and is usually used for cutoff; however, if a pickup attachment and back finishing slide are used, the cutoff can be mounted on top of a double deck toolholder in the sixth position.

All slides are operated by their own hardened and ground steel cams. Changing cams is usually unnecessary for most ordinary work, as a normal set of cams can be installed on the machine which will handle the parts by changing the high speed dog and brake on the program drum using the part of the cam required for a particular job. However, because they are



Acme-Gridley 7/16 Inch RA-6 Bar Automatic

easily accessible, when cam changes are required, they can be changed quickly.

The complete cycle of the 7/16 Inch



VAILL TUBE END-FORMING MACHINES

have hundreds of tube end-forming and shaping applications . . .
Fast, accurate production at less cost. Beading • Flaring • Flanging
• Sinking • Expanding • Grooving • Threading • Reducing • Double
Lap Flaring • Double Lap Flanging. **On tubing up to 6 in. diameter.**



FREE—New Bulletin T-1 shows and describes the versatility of Vaill Tube End-Forming Machines.



THE VAILL ENGINEERING COMPANY
133 E. MAIN STREET • WATERBURY 20, CONNECTICUT



For more data circle 450 on Reader Service Card

Which boring head will do your job?

CRITERION makes a wide range —
1½ to 7 inches in diameter.
Bore accurate holes ¼ to 20 inches.

CRITERION Heads feature widely spaced graduations — Easy reading — Accurate adjustment — Rugged construction — Dependable operation. Built for long life and chatter-free performance.

Ground shanks
and adapters
for all popular
machine tools

BORING TOOLS
Boring, grooving and
internal threading
tools are stocked in
High Speed or Carbide.

CRITERION TOOL PRODUCTS



Select your boring head
for ROUND or SQUARE
shank tools.

DIVERSIFIED OPERATION
Check the application of
these tools on Turrets or
Automatic Lathes.

MAXIMUM OFFSET TRAVEL
Save time—Money—Eliminate excessive tool change.

CRITERION MACHINE WORKS
765 WEST SIXTEENTH STREET
COSTA MESA, CALIFORNIA
Consult your dealer or write for free catalog.

For more data circle 451 on Reader Service Card

new shop equipment . . .

RA-6 bar automatic is 0.7 second at high speed. The high-speed segment of the drum shaft will be approximately 240 degrees, which will allow an idle time of 0.466 seconds added to the machining time.

For more data circle 118 on Reader Service Card

CLIPPER

PRECISION DIAMOND TOOLS

Industrial Diamonds

Thread Grinders

Turning Tools

Engraving Tools

Dressing Tools

Diamond Powder

Manufacturers of
**DIAMOND
WHEELS**

and Hones of
highest quality.
Prompt delivery.

Ask for literature

Representatives in Principal Cities

CLIPPER DIAMOND TOOL CO., INC.
345-C HUDSON ST., NEW YORK 14, N. Y.

For more data circle 452 on Reader Service Card



HACK SAW BLADE HAS ONLY THREE TEETH PER INCH

A power hack saw blade, with only three teeth per inch, has been developed and is now available from Henry Disston Division, H. K. Porter Co., Inc., 1121 Tacony, Philadelphia 35, Pennsylvania.

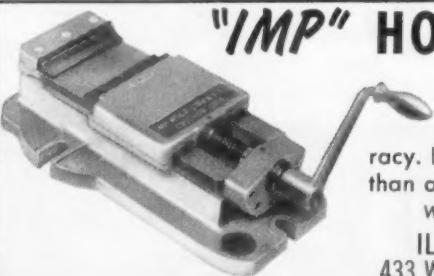
The style of this blade is said to permit efficient sawing of both large ferrous and non-ferrous metal sections and billets. It is claimed to remove more chips of metal per tooth, thereby giving increased production while lowering cutting costs. The blade is being produced in three Disston brands—Super-Safe, High-Speed and Di-Mol—and is available in 14, 18, 21 and 24 inch length.

For more data circle 119 on Reader Service Card

★ ★ ★

AUTOMATED MACHINE FOR SERIAL NUMBERING PARTS

The Machine Tool Division, Cadillac Stamp Co., 17315 Ryan Rd., Detroit 12, Mich., has announced a high production, automated machine for serial numbering transmission cases. Following previous operations, this automated machine receives transmissions (as shown in the accompanying illustration) over a roller conveyor (A) which, by gravity, delivers the parts to position against the spring



"IMP" HOLD-DOWN VISSES

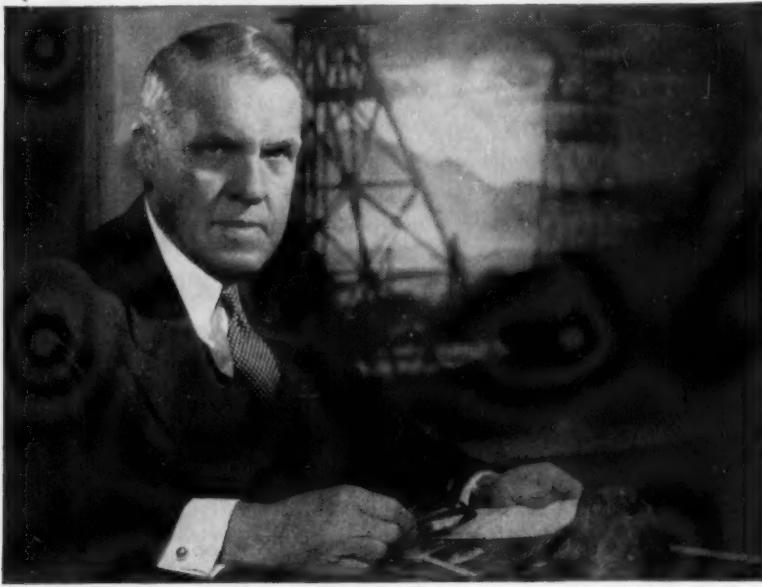
WILL Repeatedly

Chuck work with gage block accuracy. No hammering or fussing. 80% faster than any other holding device.

Write today for 8 page IMP VISE brochure

ILLINOIS METAL PRODUCTS
433 W. Superior Street, Chicago 10, Illinois

For more data circle 453 on Reader Service Card



CLYDE E. WEED

Portrait by Fabian Bachrach

"22,514 Anaconda Employees Are Buying U.S. Savings Bonds

"In October, 1955, only 34% (11,140) of the nearly 33,000 Anaconda organization employees in this country were buying U. S. Savings Bonds through the Payroll Savings Plan.

"Late in 1955, we conducted a simple person-to-person canvass which put a Payroll Savings Application Blank in the hands of every employee. There was no pressure, no special promotion—just the Application Blank. Our employees did the rest.

"Recently, our records showed that 22,514 of our employees—69%—are now Payroll Savers. Every new employee is given a Payroll Savings Application Blank and offered an opportunity to join with his fellow workers in building personal security through systematic thrift."

CLYDE E. WEED, President
The Anaconda Company

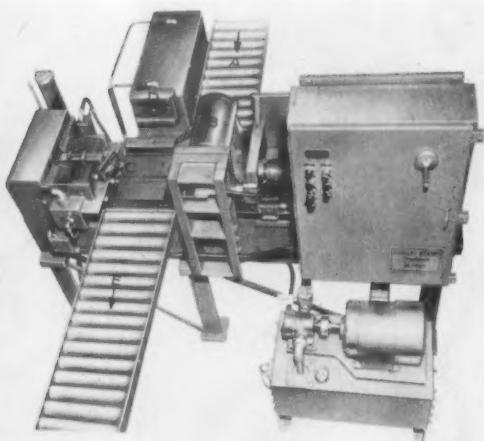
Write to: Savings Bond Division, U.S. Treasury Department, Washington.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

MODERN MACHINE SHOP



new shop equipment . . .



Cadillac Automated Serial Numbering Machine designed for transmission cases

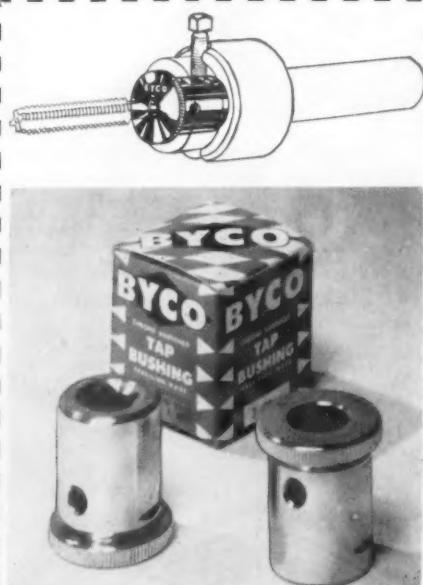
cushioned stop (B) where, on contact, a micromatic switch starts the automatic marking operation. Cases are then moved to the numbering head (C) which performs the serial numbering operation, after which the ejector (D) pushes marked cases onto another roller conveyor (E), over which the part travels to rejoin its cycle of manufacture. The entire automated marking operation is said to be performed in six seconds.

For more data circle 120 on Reader Service Card

★ ★ ★

**HYDRAULIC TRACER EXTENDS
WORK RANGE OF GENERAL
PURPOSE LATHE**

The availability of a hydraulic tracer attachment, adapting the No. 2E General Purpose Lathe to production turning jobs, has been announced by the Hendey Machine Division, Bar-



For more data circle 454 on Reader Service Card

BYCO-TAP BUSHINGS

Give Higher Quality Threads

**. . . Less Tap Breakage
. . . Less Tap Wear**

BYCO tap bushings have a square broached end to fit and drive all standard taps from No. 0 to 1½" and pipe taps from ½" to 1". Bushings are available in five o.d. sizes to fit ½, ¾, 1, 1¼ and 1½ in. tap holders. Chrome hardened for long life. Self-centering screws on each side of bushing lock tap securely and assure absolute true positioning.

Write today for Bulletin MS

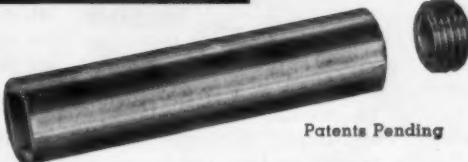
BYCO INDUSTRIES

**2200 SNELLING AVE.
MINNEAPOLIS 4, MINN.**

How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.



Patents Pending



SLEEVES MADE IN FOLLOWING SIZES:

3-16, 1-4, 5-16, 3-8, 7-16, 1-2, 5-8, 3-4, 1"

STURDY BROACHING SERVICE, INC.

23516 TELEGRAPH ROAD

DETROIT 19, MICH.

*Write for
Literature*

For more data circle 455 on Reader Service Card

For second operation and lathe work, in the grinding room, tool room, etc.

These stops have simple, self-centering neoprene rubber o-ring mounts. All friction lock, no thread adjustment, quick changing.

Will not distort collet, will stay in fixed position, will not move back, cuts scrap costs.

Also available for other collets and spindles.

Write today for Bulletin MS.

BYCO INDUSTRIES

2200 SNELLING AVE.

MINNEAPOLIS 4, MINN.

New Self-Centering

BYCO

5C COLLET STOPS

*With Quick
Friction Adjustment*



For more data circle 456 on Reader Service Card

new shop equipment . . .

ber-Colman Co., 8411 Rock St., Rockford, Ill. It is said to enable manufacturers to add a production machine at relatively low cost and enable the machine to be reconverted to general lathe service simply by removing the hydraulic tracer control and template mounting brackets.

Since the tracer unit comes as a complete package, with the pump and sump mounted on the floor at the rear of the machine, there are no additional external plumbing connections, and so on required. Mounting of the tracer itself is also extremely simple and does not require drilling or tapping any holes for either the tracer attachment or the template bracket. The tracer attachment replaces the standard compound and is held in place by the two compound bolts. Two additional bolts hold down the template holding bracket, one at each end.

A flat template is used for all production turning operations with the template being mounted at the front of the machine. Even for a relatively modest production run the cost of template making is said to be in line with the results obtained. Even when the production run consists of as few as three pieces, it pays to set up the tracer attachment. When production runs are longer, the advantages of tracer turning are obviously multiplied.

The combination of tracer turning and the stepless speed control, that is

how to trap dust

*that damages
your machines
and hurts
company morale*

Easy-to-move

TORIT

dust collectors trap dust
at its source!



Untrapped dust costs money: "secretly" forces precision machines out of line, limits production. Torit dust collectors are unitized for custom installation—save more money, usually more efficient than central (built-into-building) system. Torit unit operates only when machine or combination of machines it protects are on. Filtered air may be returned to room to save heat. Many models and sizes, all self-contained, easy to move. Write today to . . .

TORIT

manufacturing co.

Dept. 701, 296 Walnut Street, St. Paul 2, Minn.

For more data circle 457 on Reader Service Card



STANDARD STEEL SPECIALTIES

- **MACHINE KEYS**

We can supply a complete line of finished machine keys including gib head and taper keys, rod keys, round end keys, etc.

- **WOODRUFF KEYS**

Complete stock of standard keys on hand for prompt shipment. Made from open hearth or alloy steel.

- **TAPER PINS**

Available in sizes 7/10 through 10 and lengths from 3/4 inch to 6 inches. Others made to specifications.

- **MACHINE RACK**

Can furnish rack from almost any size blank and pitch as well as length to form continuous sections.

Write for catalog

STANDARD STEEL SPECIALTY CO.

BEAVER FALLS

PENNSYLVANIA

Plants: Beaver Falls, Pa.; Hammond, Ind.

For more data circle 458 on Reader Service Card

HIGH SPEED DRILLS

FLAT TWISTED AND ROLLED SECTION

Unexcelled in Quality and Performance!

• SINCE
1903

HI-DUTY Flat-Twisted and Rolled Section Drills are produced by forging and hot twisting bars of high speed steel. This method improves the structure by preserving the grain of the steel. Sizes range from $\frac{1}{2}''$ to $3\frac{1}{2}''$ and larger. Milled type drills are also available—from $1/64''$ to $1\frac{1}{2}''$ diameter. Hi-Duty means long-lasting economical service!

SPECIAL DRILLS

We manufacture a large variety of special types of high speed drills—special diameters and lengths; also step drills.

FAST DELIVERY . . .

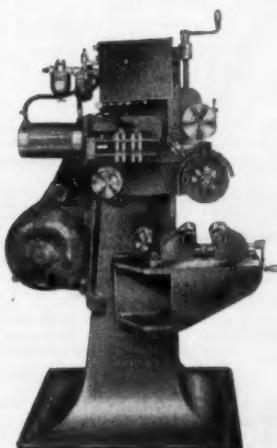
We can make immediate shipment from stock or many special drillist. Contact your Industrial Supplier . . . or write today for Catalog and Price List.

HI-DUTY DRILL WORKS

FLEETWOOD, PENNSYLVANIA

For more data circle 459 on Reader Service Card

**NOW! CUT UP TO 1,000 PIECES
OF PIPE PER HOUR . . .**



CONTINENTAL CUT-OFF MACHINES

Cut Pipes and Tubes faster with Continental High Speed Cut-Off Machines. Lowest maintenance means less cost to you. $\frac{3}{8}''$ to $12\frac{1}{4}''$ O.D. capacities, hand or automatic air-operated bench and floor models. Request free catalog.

Continental MACHINE CO.

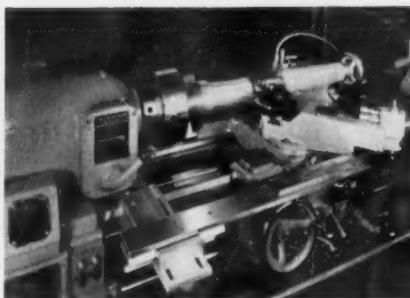
SINCE 1919

1952 N. MAUD AVE. • CHICAGO 14, ILL.

For more data circle 460 on Reader Service Card

new shop equipment . . .

a feature of the No. 2E Lathe, are claimed to assure the machining job will be done at the right speed and feed to give an outstanding surface finish. Getting the close tolerances and fine finishes that are readily obtainable on the tracer-equipped No. 2E,



Hendey No. 2E Lathe with hydraulic tracer

"SEALFLEX" TUBING



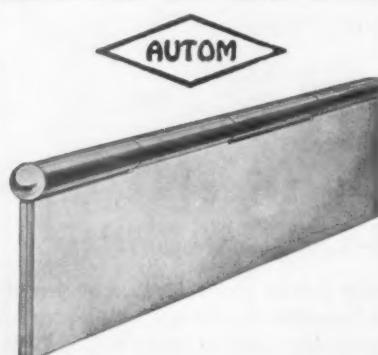
**Leakproof—
Stays in place
For Coolants, Cutting
Oils, Solvents**

Made of steel with brass fittings — males, nozzles, stopcocks, etc., made in $\frac{1}{8}''$, $\frac{1}{4}''$, $\frac{3}{8}''$, $\frac{1}{2}''$, $\frac{5}{8}''$, $\frac{3}{4}''$ I.D. Write for bulletin and prices.

VERMONT FLEXIBLE TUBING CO.

Lyndonville, Vermont

For more data circle 461 on Reader Service Card



CONTINUOUS HINGES

Manufactured by

**AUTO MOULDING
& MFG. CO.**

WRITE FOR CATALOG

1114 E. 87TH ST.

CHICAGO 19

For more data circle 462 on Reader Service Card

302 modern machine shop

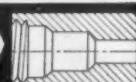
means that the user can reduce or even eliminate second operation finish turning.

The ability to change speeds, even when the spindle is under load, enables the machine to turn at virtually constant surface speed, since the operator has an infinitely variable electronic drive from 15 to 1,500 r.p.m. at his fingertips. Equally important is the instantaneous dynamic brake that is said to assure fast stopping and reversing of the spindle.

Driving this Lathe is a 5 h.p., 230 volt, d.c. variable speed motor. Power is provided by the rectifiers in the electronic panel which convert three phase, 60 cycle alternating current to direct current. Floor space required by the machine is 42 by 104 inches and the net weight, including tracer, is slightly in excess of 4,000 pounds.

For more data circle 121 on Reader Service Card

DO YOU NEED
BORES LIKE THIS?



Comet. LOW COST

High Speed Steel

STEP DRILLS

are the
answer!

Made to
Your Own
Specifications

PROMPT SERVICE



Write for Complete Data

COMET Tool Co.

738MM Broadway
New York 3, N. Y.

For more data circle 463 on Reader Service Card

January, 1957

BARKER Bench Type **MILL**
for Production Milling
of Small Parts by
Unskilled
Help



Write for
Details

500 GREEN RD., CLEVELAND 21, OHIO

Screw Feeds
Optional

at Extra
Cost.

BARKER
ENGINEERING
COMPANY

For more data circle 464 on Reader Service Card

NOW! LATHE USERS
CHANGE TOOLS
in a ... FLASH ..

Only a second to change tools for turning, facing, drilling, boring, threading, knurling, cutting off or any other operation.

- GREAT REPETITIVE ACCURACY.
- RUGGED CONSTRUCTION.
- TESTED AND RECOMMENDED BY LEADING LATHE MANUFACTURERS.
- GREATER RIGIDITY.
- SAVES 90% IN SET-UP TIME.
- UNCONDITIONALLY GUARANTEED.

Write for catalog and
price list.

NIBBLE
Your COSTS

WITH...

SAVAGE
NIBBLING MACHINES

- TUBE CUTTING
- CIRCLE CUTTING
- STANDARD NIBBLING
- FREE-HAND or TEMPLATE CUTTING
- SPEED WITH ACCURACY NO SECONDARY OPERATIONS
- SPEED WITH SAFETY NO OPEN FLAME OR SPARKS



Up to $\frac{3}{8}$ " Capacity
in MILD STEEL

QUOTATION ON REQUEST

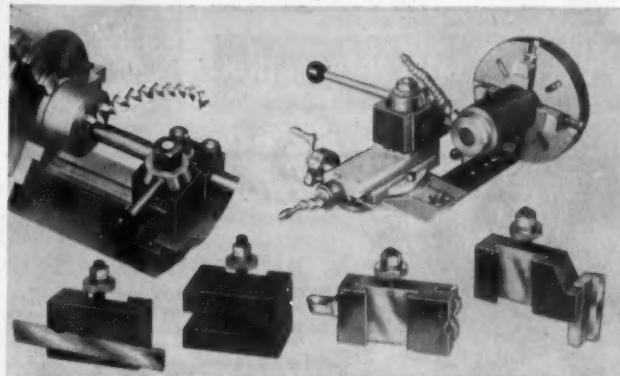
W. J. SAVAGE COMPANY
KNOXVILLE TENNESSEE
NIBBLING MACHINE PIONEERS

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ALORIS
QUICK CHANGE

TOOL POSTS & HOLDERS

Speed Your Operation . . . Save You Money



ALORIS TOOL CO., INC.

131-37 SANFORD AVENUE
FLUSHING 55, N.Y.

For more data circle 466 on Reader Service Card

new shop equipment . . .

HACKSAWS ARE COLOR IDENTIFIED

A complete line of power and hand hacksaw blades has been announced by The L. S. Starrett Co., Athol, Mass. Each of the three types of blades has special characteristics for fast, easy



VERTICAL

At last, a top quality industrial sander that provides all the most wanted **\$89.95** features—yet sells for so little.

complete with cord, plug, switch ready to use

Illustrated Literature on Request

A few desirable distributor territories still available.

WALLS SALES CORPORATION
333 Nassau Avenue Brooklyn 22, N. Y.

For more data circle 467 on Reader Service Card

cutting and long blade life on a wide range of cutting assignments. To make it easy to select and use the right blade for any job, they are distinctively color-identified and have easy-to-remember trade names.

Redstripe SM Special Alloy High Speed Steel Power and Hand Blades combine new developments in heat-treating with the long-wearing qualities of special high-speed steel. They are specially tempered for extra toughness and high-speed cutting of hard materials with heavier speeds and feeds. Redstripe blades are yellow with a distinctive red stripe.

Greenstripe Safeflex Welded Edge Power Blades and Hard Edge-Flexible Back Hand Blades are double welded to make them shatterproof, safe, straight-cutting and long-lasting. They are particularly recommended for tough alloy steels, multiple cutting or interrupted cuts. The hand blades

Buy safe "SHUR-GRIP"

drop forged HANDLES

Designed to hold 3 to 6 lb. lead hammer heads more firmly — will not slip — keeps hammer head in shape longer — makes remolding easier, quicker, surer, less expensive.

Write for circular and prices

LAWRENCE H. COOK, INC.

67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

For more data circle 468 on Reader Service Card

*You Need an Extra Hand Now
to Speed Up Production!*

HEIMANN TRANSFER SCREW SETS

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per-hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money too!

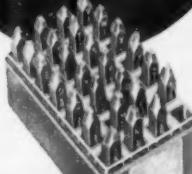


HEIMANN MFG., CO. • URBANA, OHIO

For more data circle 469 on Reader Service Card

10% to 25% MORE SERVICE
with

Mecco
SAFETY
Hevi-Bev
Letters & Figures



INDESTRUCTIBLE PLASTIC BOX
with transparent lid furnished
with stamps $\frac{1}{4}$ " and smaller.

Mecco
SAFETY
MARKING TOOLS

M.E. CUNNINGHAM CO.

1051 CHATEAU STREET, PITTSBURGH 33, PA.
A PRODUCT OF THE MARKING DEVICE INDUSTRY
For more data circle 470 on Reader Service Card

Precision Tapping

by hand or machine with

**DAHLSTROM
TAP GUIDE**

saves countless hours
by preventing
broken taps.



Machine Tapping

The spindle top is center-bored to fit the tail stock of a lathe. Simply pull out for lathe use. Same spindle can be used as a tap extension for reaching difficult places. Furnished with 9 adaptor sizes: 8-32; 10-24; $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$, and $\frac{5}{8}$. Write for bulletin.

**\$5.950 F.O.B.
FACTORY**

BRANCH MFG. CO.
15 Olson Drive,
North Branch Minn.

For more data circle 471 on Reader Service Card

STOP COSTLY HAND WORK!



Model DA
Air.

**SPEED THE
TOUGH JOBS**
with *Easy*
DUAL-ACTION
TWO SANDERS
IN ONE

Machinery Manufacturers

Saves up to 80% time and abrasives
sanding surfacer (plaster) costs.
ives sanding surfacer (plaster) costs.
Honing dies, deburring, removing
tool marks.

DUAL-ACTION OR STRAIGHT LINE.
AN *Easy* FOR EVERY JOB.

Model
DF
Electric.

Model
JR Air.

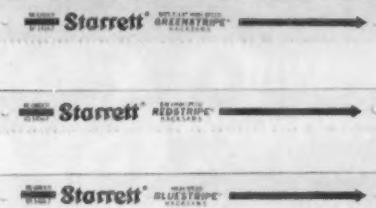
DETROIT SURFACING MACHINE CO.

For more data circle 472 on Reader Service Card

new shop equipment . . .

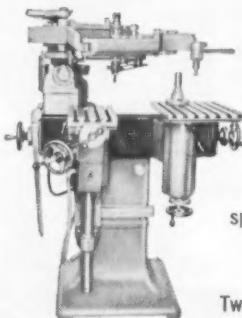
combine a hard cutting edge and flexible back. Greenstripe Blades are yellow with a distinctive green stripe.

Bluestripe Selected High Speed Steel Power and Hand Blades are specially heat-treated for high-speed production sawing of hard-to-cut metals



Color-Identified Starrett Hack Saw Blades

ALEXANDER die sinkers for 2 or 3 dimensional work



Latest model, No. 3A for molds and dies up to 1000 lbs. Ratios from 1.5:1 to 10:1, 14 spindle speeds from 475 to 9500 rpm, cutters up to $\frac{3}{8}$ " dia. Two smaller sizes, 1A and 2A.

Write for Catalog C
on these quality, British machines.

J. ARTHUR DEAKIN & SON
150-28 HILLSIDE AVE., JAMAICA 32, N. Y.

For more data circle 473 on Reader Service Card

like high alloy steel, stainless steel, phosphor bronze, tool steels, rails, Allegheny metal, chrome steel, Monel metal and so on. These blades are also recommended for general purpose cutting because one pitch of teeth will cut a wide range of metals. Bluestripe Blades are yellow with a distinctive blue stripe.

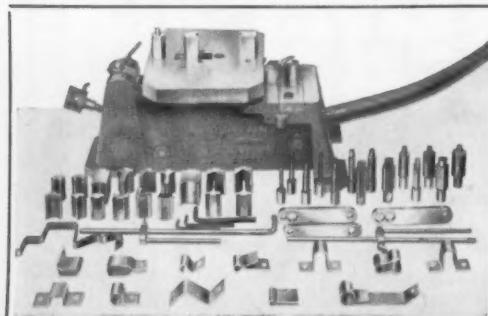
These hacksaw blades are packaged in heavy-duty protective boxes which feature a red and yellow design with foldover labels on the top and end.

For more data circle 122 on Reader Service Card

CENTERLESS GRINDING

Brown & Sharpe and Swiss Automatic screw machine parts, aircraft and standard, heat treated and ground if necessary. Send blue prints for estimates. 27 years serving industry. The Porter Machine Co., Cincinnati 9, Ohio.

For more data circle 474 on Reader Service Card



For more data circle 475 on Reader Service Card

Multiform BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

AIR OR HAND MODELS FOR UP TO $\frac{1}{4}$ " to 4" MATERIAL

Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.
Dept. 6-M Kalamazoo, Mich.

**.0003 HOLE LOCATION
IN 1 MINUTE**

EDGE FINDERS

\$2.50

NEW

**POSTPAID \$10.00
except C.O.D.**

DELUXE



- THOUSANDS HAVE PROVEN AND ACCEPTED THE DELUXE MODEL FOR YEARS.

- JUMPS SIDEWAYS AS SHOWN WHEN LOCATION IS REACHED

- ← NEW .500 DIA. MODEL FOR LARGER WORK ONLY. .200 DIA.



ADJUSTABLE VISE STOP



\$2.95

HUNDREDS OF PIECES TO A .0003 TOLERANCE WITH THIS HARDENED VISE STOP THAT IS ADJUSTABLE IN ALL DIRECTIONS.

ATTACH TO VISE WITH ONE $\frac{1}{4}$ -20 TAPED HOLE.

Dealer Inquiries Invited

GLOVER MFG. CO.

422 Park Ave.

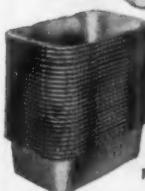
Meadville, Penna.

For more data circle 476 on Reader Service Card

"PAK-N-STAK"

Bathey

Leak proof drawn steel.
Most economical pan
offered to industry



Length 18 $\frac{1}{4}$ "
Width 11"
Depth 5 $\frac{1}{2}$ "

Nested



Stacked

MBC

Dealers in principal cities.

Write for catalogue

BATHEY MFG. CO.

100 SO. MILL ST.

PLYMOUTH, MICH.

For more data circle 477 on Reader Service Card

January, 1957

**THIS
W-S Form Mill**



*Cuts
These
Grooves*

Typical of the type tool Woodruff & Stokes is called upon to design is the special Form Mill illustrated above. This tool was designed specifically to cut the grooves in the "guide bar" of the Eversharp-Schick Hydro-magic Injector Razor—a feature that eliminates the need to stretch skin when shaving.

With this W-S Form Mill, which is used with a specially designed Taft-Pierce Milling Machine, all grooves are cut quickly, efficiently, and simultaneously.

Our ability to solve special-tool problems has been proven repeatedly with leading manufacturers throughout the country. If you have need for a special tool up to $\frac{3}{4}$ " diameter, why not let us help you?



WOODRUFF & STOKES CO.

INCORPORATED

Bldg. 32, 355 Lincoln St.,
Hingham, Massachusetts

For more data circle 478 on Reader Service Card

modern machine shop 307

new shop equipment . . .

STEP-VALVES HAVE FAST, EASY ACTION

Mead Specialties Co., Dept. SV-42, 4114 North Knox Ave., Chicago 41, Ill., recently announced the availability of two new step-valves. Larger,

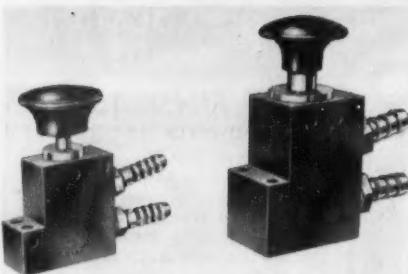


Illustration showing Two Mead Step-Valves

HARGRAVE CLAMPS

A Complete Line of Clamps for all Purposes

Individually
Power Tested
for Better
Performance.



"C", Steel Bar,
Quick Acting,
Wood Hand
Screws, Welders

WRITE FOR FREE CATALOG.

Showing Clamps, Chisels, Punches, Masonry Drills for hand and power hammers, Carbide Drills, Washer Cutters, and File Cleaners.

Stocked by Your Local Distributor.

THE CINCINNATI TOOL COMPANY
1947 Waverly Ave., Cincinnati 12, Ohio

For more data circle 479 on Reader Service Card

more direct air passages are said to give these valves their quick action and, because of the spool type plunger construction, the effort required to actuate the valves does not increase with increased air line pressure.

To maintain compact size and direct air passages, the air inlets and outlets are close together, but the hose nipples are at an angle to accommodate quick connectors and large diameter air hose.

Valve bodies are accurately machined from aluminum; plungers are hard chrome plated steel; caps, plugs and hose nipples are brass; Hy-Car seals—all of which are said to be non-corrosive. The valve plunger reaches wide open position before the end of the stroke, saving wear and tear on the seals and springs. For cam operation, the plastic knobs are replaced by



Handle your small part precision JIG BORING on the LINLEY JIG BORER

Why tie up your big,
costly jig borers on small
work when you can get
maximum utility at less
cost per hour on a ma-
chine exactly fitted to
your work. Put your small
work on the LINLEY where
it belongs and reserve
your large machines for
large work, where large work
belongs. You'll save money
this way.

Complete details sent
promptly on request

Specifications

Table Movement:
6" x 10"
Table Size:
7" x 17½"

LINLEY BROTHERS CO.

661 State St. Ext.,
BRIDGEPORT 1, CONN.

For more data circle 480 on Reader Service Card

308 MODERN MACHINE SHOP

Now . . . carried in stock . . .



AND 10050 Porting Tools

A complete line of carbide
tipped combination ream, coun-
ter-bore and facing tools to
machine standards.
Combines 5 operations in one
tool! Thoroughly proven.

WETMORE TOOL & ENGINEERING CO.
5320 E. WASHINGTON BLVD., LOS ANGELES 22, CAL.

For more data circle 481 on Reader Service Card

January, 1957



**FAST
NAME-PLATE
STAMPING**

ACROMARKER patented machines are used by the thousands because they're so adaptable to any straight line or true curved line marking job. Several sizes are stocked from $\frac{1}{16}$ " to $\frac{3}{8}$ " characters. Styles range from bench and floor stand models to the high production power unit illustrated below that automatically stamps the name-plates and prints the record simultaneously.



Write for fully illustrated color folder with price list. Send sample name-plate for example of marking. Specify markings and production required for engineer's recommendation.

the
ACROMARK
Company

9 MORRELL ST., ELIZABETH 4, N. J.
"The Original Marking Specialists"

For more data circle 482 on Reader Service Card

January, 1957

Another

**VICTOR
VALUE**



**Top Quality
Lowest Prices**

Our Special Import . . .

**DIAMOND
WHEEL DRESSERS**

Made of selected, full individual stones, mounted in $7/16$ " diameter x 6" long cold rolled shank.

Karat	Regular Price	Our New Price
$\frac{1}{4}$	\$ 6.00	\$ 2.85
$\frac{1}{2}$	12.00	5.00
$\frac{3}{4}$	21.00	7.50
1	30.00	10.25
$1\frac{1}{2}$	54.00	15.00
2	75.00	20.00
$2\frac{1}{2}$	102.00	26.00
3	130.00	32.00

These diamonds can be set in any shank to your specifications for \$1.00 each extra.

Order today—Immediate
Delivery From Stock!

VICTOR
MACHINERY EXCHANGE, INC.

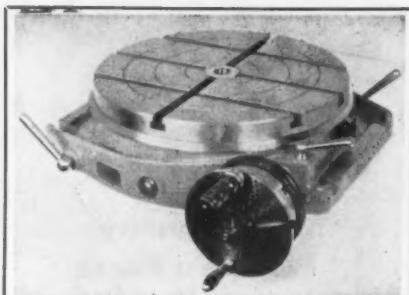
Dealers in Tool Room Equipment

Dept. B, 251 Centre St.

Tel.: CANal 6-5575, New York 13, N. Y.

For more data circle 483 on Reader Service Card

modern machine shop 309



WALTER
PRECISION DIVIDING ROTARY TABLES

With & Without Dividing Discs

- READABILITY: 6 SECONDS.
- CONSTRUCTED FOR LONG LIFE.
- MAINTAIN PRECISION.
- AVAILABLE IN 10", 12 $\frac{1}{2}$ ", 15 $\frac{3}{4}$ ", 19 $\frac{3}{4}$ ", 25", 31".

Also many types of Universal Precision Dividing Heads and Attachments for most economical production.

Test reports furnished with literature.

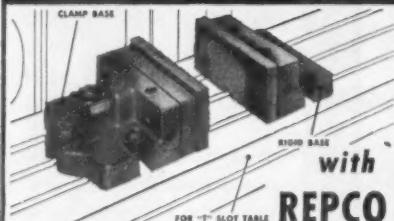
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**NEISE
MODERN TOOLS**

KARL A. NEISE
404 4th Ave., Dept. MMS,
New York 16, N. Y.

For more data circle 484 on Reader Service Card

INCREASE AVAILABLE CLAMPING CAPACITY



REPCO
2-Piece Machine Vise Set

Cuts costs . . . supplements use of one-piece vises. Machined for precision accuracy.

- Two Sizes — 6" and 8" widths. Depth 2 $\frac{1}{2}$ ". T-Slot center distances: 2 $\frac{1}{4}$ " - 2 $\frac{3}{4}$ ", 2 $\frac{3}{4}$ " - 3 $\frac{3}{4}$ ".
- Greater Versatility — useable as general purpose vise, as an angle block, as separate clamping device.

Write for Bulletin 100 - Dealer Inquiries Invited

ROCKFORD ENGINEERED PRODUCTS CO.
2324 23rd Avenue • Rockford, Illinois

For more data circle 485 on Reader Service Card

310 modern machine shop

new shop equipment . . .

hardened steel heads. The valves can be furnished in either spring return or self-locking type, normally closed or normally open.

For more data circle 123 on Reader Service Card

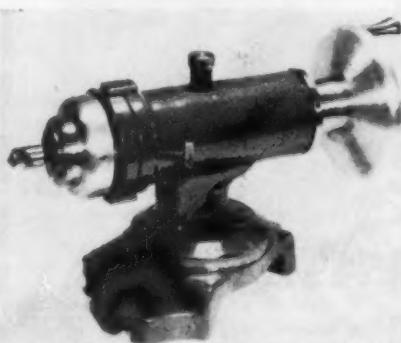


RELIEF GRINDER

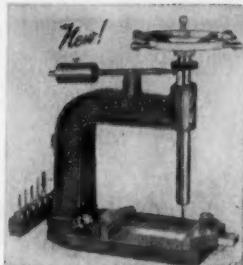
Steptool Co., 3613 East Olympic Blvd., Los Angeles 23, Calif., has announced a relief grinding fixture, which is a simple and efficient cam actuated device for the relief grinding of step drills, countersinks, taps and so on. According to the manufacturer, operators can be trained to use this fixture in approximately 10 minutes.

The device uses a single solid cam for infinite adjustment or clearance lift; index hubs contain indexes for different numbers of flutes, which can be slipped on or off in a matter of seconds. An extended spindle in the rear permits addition of a pulley to motorize. This fixture uses 5-C collets and has a rugged base graduated to 360 degrees. The spindle locks with a twist of the wrist. This unit weighs 26 pounds.

For more data circle 124 on Reader Service Card



View of Steptool Relief Grinding Fixture



LASSY

Supersensitive Hand Tapper

New exclusive features and top quality make Lassy Tappers outstandingly the finest available. Write for illustrated circular showing 3 models, and also Universal Tap and Die Guide.

LASSY TOOL COMPANY, Plainville, Conn.
For more data circle 486 on Reader Service Card

READING BENCH KEYSEATER

Portable—move directly to job; a time saver for both small and large shops.

3½" stroke; adaptable for other work.
Low first cost—prompt delivery.

Good dealers wanted.

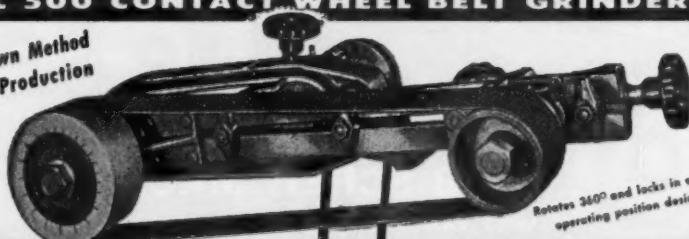
**READING MACHINE CO.
CINCINNATI 37, OHIO**



For more data circle 487 on Reader Service Card

MODEL 500 CONTACT WHEEL BELT GRINDER

The Fastest Known Method
of Increasing Production



Rotates 360° and locks in any
operating position desired.

WRITE FOR COMPLETE INFORMATION
ON INCREASING YOUR PRODUCTION

B & E MFG. CO., INC.

2104 EAST 21 STREET
KANSAS CITY 9, MISSOURI

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PRECISION GEARS?

ROLL TEST THEM RAPIDLY— ACCURATELY with the

SCHERR 5" CENTER DISTANCE FINE PITCH GEAR TESTER



Fine Pitch Precision Gears are quickly tested
for runout of Pitch Diameter, Spacing and
Tooth Form Errors.

Scale Vernier:
.0005" Indicator Readings

The New Model
is equipped with adjustment of
measuring pressure from
4 ounces to 2 pounds

OTHER SIZES OF GEAR TESTERS
AVAILABLE UP TO 30".

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Illustrated Folder - Code GIKNA

GEORGE SCHERR CO., Inc.

200-MM LAFAYETTE ST. • NEW YORK 12, N.Y.

For more data circle 489 on Reader Service Card



**NOW,
for the
FIRST TIME**

... a tap specifically for screw machines. Shorter, more rigid shank. Cuts clean and free without "bellmouth." Reduces tap breakage. Lasts longer. Excellent for all machinable metals. Spiral point, high speed steel, ground thread . . . plug or bottoming types. Write for complete information.

STUB SCREW MACHINE TAPS

**WIDE RANGE OF SIZES FROM STOCK AT THE
PRATT & WHITNEY OFFICE NEAR YOU**

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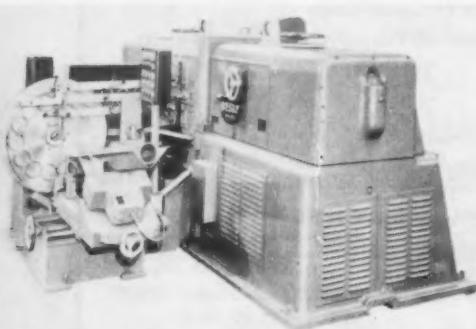
new shop equipment . . .

PUSHBUTTON GRINDING MACHINE

The No. 240-30 Inch Double Horizontal Disc Grinder has been intro-

duced by The Besly-Welles Corp., 108 Dearborn Ave., South Beloit, Ill. It has all spindle motors contained within the broad, low, massive, easily accessible base, with pushbutton controls on both sides. According to the manufacturer, the improved design reduces maintenance, dressing, changes and setup time.

With pushbutton controls and at-a-glance reading of head and disc alignment, sealed spindle quill construction, automatic pushbutton dressing, automatic sizing to adjust for disc wear, edge-grain Formica wearing ways, head assembly neoprene sealed against dust and coolant, fast magnetic rotary through feed, and easy disc removal, the manufacturer claims that this machine is unusually accurate (0.0001 inch parallelism) and is a practical grinder for high-speed precision finishing of piston rings, bear-



Besly-Welles No. 240-30 Inch Disc Grinder

ing rings, automatic transmission plates and a wide variety of other similar shapes.

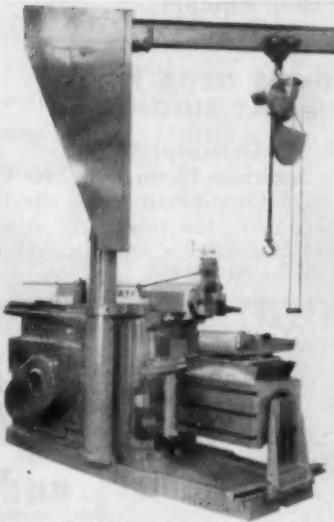
For more data circle 125 on Reader Service Card

★ ★ ★

SHAPER FEATURES INTEGRALLY MOUNTED BOOM CRANE

The Cincinnati Shaper Co., Cincinnati 25, Ohio, recently introduced its 32 inch Heavy-Duty Rigid Shaper, shown in the accompanying illustration. This shaper is equipped with an integrally mounted boom crane, which is claimed to simplify operator handling of heavy workpieces, fixtures and so on. Other features of this versatile shaper include a nodular iron ram, 50 p.s.i. pressure lubrication system, electro-magnetic clutch and brake, automatic tool lifter and universal table.

For more data circle 126 on Reader Service Card



Cincinnati 32 Inch Heavy-Duty Rigid Shaper equipped with integrally mounted crane

★ ★ ★ ★ ★

HIGH Precision at LOW Cost

THE PRATT & WHITNEY SIGMATIC COMPARATOR . . .

a moderately priced instrument that combines the simplicity and dependability of mechanical gaging with unusual accuracy. Magnification range from 300X to 5000X. Repeatability to millionths of an inch. Self-contained, readily portable. For a wide range of external gaging operations. Ask for Circular No. 599. Pratt & Whitney Company, Inc., 25 Charter Oak Blvd., West Hartford, Conn.



PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS



For more data circle 491 on Reader Service Card

new shop equipment . . .

HARDNESS TESTER IS COMPLETELY AUTOMATIC

Wilson Mechanical Instrument Division, American Chain and Cable Co., Inc., 929 Connecticut Ave., Bridgeport 2, Conn., has introduced Size 3 Console Model Fully Automatic Hardness Tester. With this unit, the man-

ufacturer claims it is possible to automatically classify up to 1,000 Rockwell tests per hour on large production runs by hand-feeding individual pieces. This unit is said to test any metal on the regular Rockwell scale.

It automatically classifies tested workpieces into one of three categories —correct, too hard or too soft. The device has controlled hardness limits as close as two Rockwell numbers and is equipped with an automatic counter.

In addition, it has an automatic safety stop for pieces not fed properly.

Workpieces may be tested in this unit in one of two ways: manual feed and manual disposal; and semi-automatic, with manual loading and automatic disposal and classification as to hardness.

By making a simple change of plunger extensions, the unit can be set up to test materials that vary in thickness from 0.030 inch to 6 inches. Single tests may be performed by merely snapping a switch which changes the cycle from continuous to single operation. With hand-fed operation for individual testing, control of the unit



**Weldon distributors throughout U.S.A. and Canada
carry complete stocks to serve you.**

SEND FOR LATEST CATALOG NO. 11

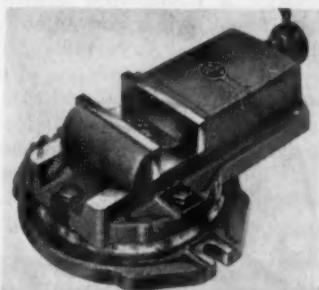
THE WELDON TOOL COMPANY



3000 WOODHILL ROAD . . . CLEVELAND 4, OHIO

For more data circle 492 on Reader Service Card

PREWO PRECISION MACHINE VISES



• UNDERDRAW CONSTRUCTION

No Lifting of Jaws • Faster Clamping
Workpiece Held More Securely

• HIGHER ACCURACY

Various Types: For Milling and Drilling
Machines; also Quick Clamping Vise
With and Without Swivel

Highest Precision Toolmakers'
Universal Vises also available

**NEISE
MODERN TOOLS**

KARL A. NEISE
404 4th Ave., Dept. MMS,
New York 16, N. Y.

For more data circle 493 on Reader Service Card

Attach this page to
your letterhead and
we will forward our
new 16-page catalog
to you.



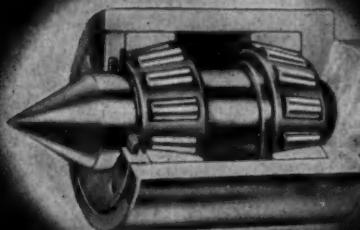
CONICAL TOOL CO.

3801 Buchanan S.W., Grand Rapids 8, Mich.

For more data circle 494 on Reader Service Card

...heavy loads at high speeds

Falls ROTO CENTER



for
lathe and grinder
tail stocks

Accurate, low cost turning
on tough continuous-run
work. Preloaded, matched
roller bearings assure
rigid set-up. Precision
ground shank. Heavy-
duty grease seal. Many
exclusive features.



FALLS PRODUCTS, INC., 124 Genoa Street, GENOA, ILL., U.S.A.

For more data circle 495 on Reader Service Card

new shop equipment . . .



Wilson Console Model Hardness Tester

is through a pushbutton control or through a foot switch conveniently located under the console table.

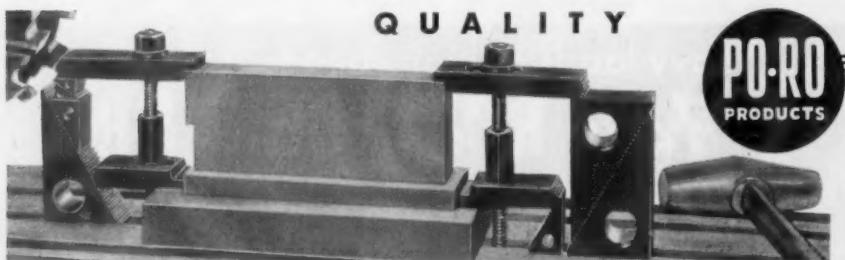
As each piece is tested, one of three lights on the tester will indicate the hardness classification — red for too hard, green for correct and yellow for too soft. This feature permits supervisors to observe results of testing as the work is sorted into the separate disposals.

The automatic counter for the three hardness classifications can be permanently mounted on the desk or can be located at a remote point any distance from the hardness tester.

Desk type construction of the console enables simple automatic operation, as well as individual testing without fatigue by the operator. The top of the table measures 24 by 50 inches, height from the floor to the table is 31 inches, and overall height of this

★ ★ ★ ★ ★

Q U A L I T Y



PO-R-O
PRODUCTS



**STUD
SETS**

Stud sizes: $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ " & $\frac{3}{4}$ ". Sets consist of 12 studs and 2 each of Tee, Coupling and Flange Studs.



**CLAMP
BLOCKS**

Adjustable in $\frac{1}{8}$ " steps in **BOTH** vertical and horizontal positions. $\frac{1}{2}$ " to 10" height with one set of blocks.

Slip proof serrations. Hardened steel.



**STRAP
CLAMPS**

For $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ " & $\frac{3}{4}$ " studs. Serrated to match Clamp Support Blocks. Reversible. Long and short. Drilled and slotted.



LEAD HAMMER EXCHANGE SERVICE

1 $\frac{1}{2}$, 3 & 5 lb. sizes. Long life alloy. Non-slip, non-twist, comfortable handles. Exchange beat up PODLIN hammers for new ones.

PODLIN TOOL CO., 11917 Franklin Ave., Franklin Park, Ill. • GL 5-6745

For more data circle 496 on Reader Service Card



STAGGER TOOTH WOODRUFF CUTTERS

- STANDARD STOCK ITEM
- STANDARD PRICES
- SMOOTHER CUTTING
- LONGER LIFE

Recommended for cutting tough,
hard to machine materials.

Agents' and Jobbers' Inquiries Welcome
QUALITY TOOL WORKS
792 S. MARKET ST. • WAUKEGAN, ILL.

For more data circle 497 on Reader Service Card

FLYNN BORING HEADS



**LEADING NAME IN
BORING HEADS FOR 40 YEARS
19 MODELS** Write for catalog

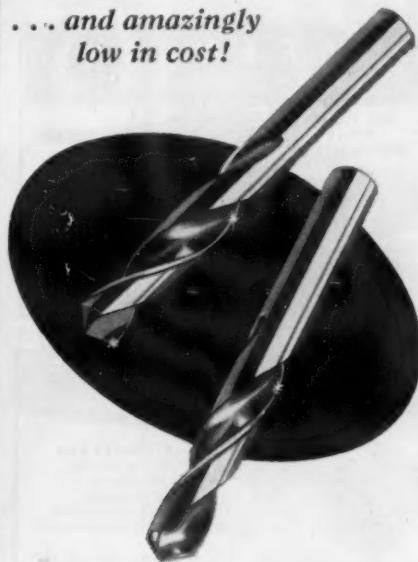
FLYNN MANUFACTURING CO.
133 FLOWERDALE AVE. • DETROIT 20, MICH.

For more data circle 498 on Reader Service Card

January, 1957

They're tough, they're versatile

... and amazingly
low in cost!



ACE

STUB DRILLS

The short, heavy duty flutes of Ace Stub Drills are ground into top quality pre-hardened high speed steel to give you keener cutting lips, extra strength, longer drill life. Ideal for close-to-work screw machine operations and portable drilling. And they're now stocked in 140 standard sizes that cost approximately 20% less than equivalent jobber length drills!

Call your local Ace Drill Distributor today!



ACE DRILL

ADRIAN, MICHIGAN

ORIGINATORS OF "GROUND-FROM-THE-SOLID" DRILLS

For more data circle 499 on Reader Service Card

modern machine shop 317

BREMIL
The IMPROVED Compound Lever Shears

ALL ALLOY
FULLY
GUARANTEED



Two Sizes

PORTABLE

No. 1 cuts up to No. 11 gauge strip or sheet.
No. 2 cuts up to $\frac{1}{4}$ " steel plate.

BREMIL MFG. CO.
1020 Holland St., Erie, Pa.

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CAM MILLING JIG BORING

A SPECIALIZED CAM MILLING SERVICE.
JIG BORING
...SPOT WELDING
...CONTRACT PRODUCTION
EXPERIMENTAL DEVELOPMENT

SEND FOR NEW CATALOG NO 52-CN

EISLER ENGINEERING CO., INC.
734 S. 13TH ST., NEWARK 3, N. J.

For more data circle 501 on Reader Service Card

new shop equipment . . .

unit is 48 inches. Larger table tops can be furnished by the manufacturer. Various plunger extensions are included for testing different thicknesses of work.

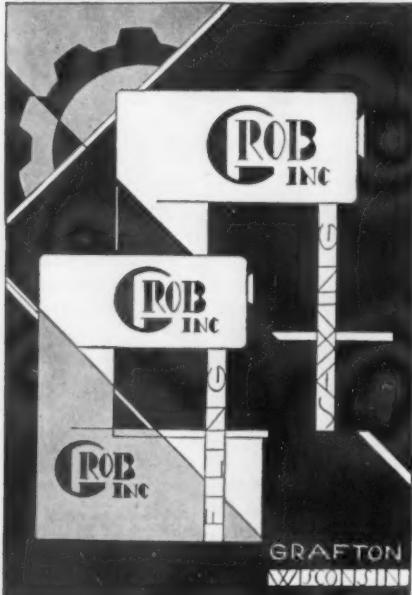
For more data circle 127 on Reader Service Card

★ ★ ★

**Fixture Lock Has Many
TimeSaving Uses**

Wilton Tool Manufacturing Co., Inc., Schiller Park, Ill., has introduced its Rapid Titan Fixture Lock, which is an economical jig and fixture device that features automatic clamping, automatic release and positive screw tightening. According to the manufacturer, many routine clamping jobs can be speeded and simplified with this fixture lock. The free sliding action of the screw is claimed to make it possible to save time and maneuver the workpiece more easily. The continuous tightening feature enables the operator to secure work safely in machines, on benches or in special fixtures. The front and bottom of the body are machined flat, to an accurate 90 degree angle, and mounting holes are provided in both faces. The screw is cadmium plated and has a travel of $6\frac{1}{4}$ inches.

For more data circle 128 on Reader Service Card



For more data circle 502 on Reader Service Card



View of Wilton Rapid Titan Fixture Lock

TOOL ENGINEERS and TOOL MAKERS

HERE IS
A NEW TOOL TO STUDY.
HIGHEST STANDARD OF EFFICIENCY
AND ACCURACY UNRIVALLED
IN PRICE AND
VALUE

It's the NEW



QUICK CAMLOCK
+
MICRO TITE ADJUSTMENT COMBINED

Made by the
FAMOUS



SPECIFICATIONS

Total Length: 7" - Measuring Capacity:
4" - Graduations: 1/1000" &
1/128" - Code Word: GINHO

Without detachable Height Scribe
Gauge Base and Scriber - **\$25.00**

Same as above but with
detachable Base and Scrib. **\$33.00**
or - Code GINFU



SOLD ON A 10-DAY
MONEY BACK
GUARANTEE

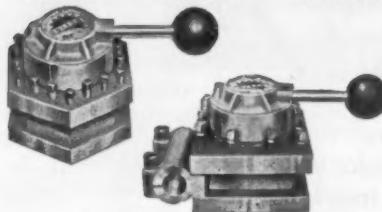
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GEORGE SCHERR CO., Inc.
COMPLETE LINE OF PRECISION INSTRUMENTS

200 MM LAFAYETTE ST. • N.Y. 12, N.Y.

For more data circle 503 on Reader Service Card

"WEDGE-LOCK" TURRET



Does not raise up when indexing in all 12 positions. 4-way and 6-way block models. Repetitive accuracy to within .0003 plus or minus within itself.

WRITE FOR FOLDER

Makers of Combination Rotary Tables and Angle Plates. Also Helical Gear Speed Reducers, Single and Double Reduction. Also Special Gears of All Types.

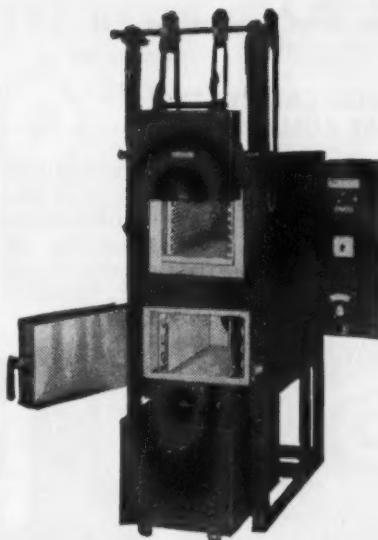
Open territory available to representatives.

OLSON INDUSTRIAL PRODUCTS, INC.

40 W WATER ST • WAKEFIELD MASS

For more data circle 504 on Reader Service Card

January, 1957



SAVE SPACE WITH A SERIES 8055 COMBINATION MODEL

Two independent furnaces (hardening and drawing) in the same floor space one requires. Complete with independent controls. Hardening furnace available in both a 2000° and a 2300° F. range.

Drawing furnace has a maximum of 800° F.* Quench tank included with the exception of the largest standard model.

Chamber Size	H. W.	L.	2000° F.	2300° F.
6" x 6" x 12"			\$ 750.00	\$ 850.00
9" x 9" x 18"			1150.00	1250.00
12" x 12" x 24"			1600.00	1700.00
18" x 18" x 36"			2400.00	2500.00

* Also available up to 1250° F.

WRITE FOR FREE LITERATURE, SPECIFICATIONS and price list of Lucifer Furnaces in wide range of sizes — top loading and side loading types. Engineering advice without obligation. Write, wire or phone today.

**LUCIFER
FURNACES, INC.**

NESHAMINY 6, PA.

Phone Osborne 5-0411

For more data circle 505 on Reader Service Card

new shop equipment . . .

LARGE CABINET-TYPE DUST COLLECTOR

Designed to handle heavy-duty continuous grinding and other high dust volume sources, Torit Manufacturing Co., Dept. KP, 296 Walnut St., St. Paul 2, Minn., has announced its Model 123 Dust Collector. Handling

as many as eight grinding wheels at a time, the Model 123 has a dust storage capacity of 10 cubic feet and a filter area of 300 square feet. Its 5 h.p. motor moves approximately 2,000 cubic feet of air per minute through an 8 inch inlet at speeds of more than a mile a minute. Static pressure for this inlet is 3½ inches water.

The welded steel cabinet is finished in baked gray enamel, and cloth filters are chemically treated for spark resistance and sealed against leakage. Filters, motors and blowers are easily reachable through removable doors.

The motor is internally mounted in the clean air stream above the filters for cool, quiet and efficient operation. Manual starter with overload protection is standard equipment, while explosion - proof motors and magnetic starters are optional. If desired, the collector



NEW METHOD ROLL MARKER SLASHES COSTS!

**eliminates
secondary
O.D. marking
operation**

- for screw machines, lathes, etc.
- completely automatic • easy to set up
- quick roll die change • interchangeable dies
- adjustable impression depth
- heavy-duty construction

Write today for Bulletin 500-C
Inquiries from Sales Reps. invited



NEW METHOD STEEL STAMPS INC.

147 JOS. CAMPAU • DETROIT 7, MICH.

For more data circle 506 on Reader Service Card



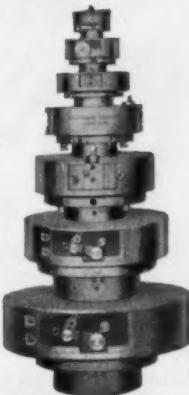
Torit Dust Collector

MUMMERT-DIXON FACINGHEADS

Two-way tool feed
in 9, 12, 16, 20, 24,
30, 36, 40 and 46
sizes.

One-way tool feed
in 6, 9 and 12 sizes.
Automatic feed —
convenient tool adjustment — quick
feed reverse. Save
time and costly set-
ups.

Write for
folder.



MUMMERT-DIXON CO.
120 PHILADELPHIA ST. • HANOVER, PA.

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THE HELIOS

50 EK VERNIER CALIPER

With Automatic Thumb Lock . . . With all Inch Scales or one Inch and one Metric Scale:

\$9.90

The 55 A with set screw lock with one inch and one Metric scale or all Inch scales:

\$8.90

All prices F.O.B. New York

Also available . . .

Dull Chrome finish calipers
and Dial Indicator callipers

For details on other imported
precision instruments, write



**NEISE
MODERN TOOLS**
KARL A. NEISE, Dept. MMS
404 Fourth Avenue
New York 16, N. Y.

For more data circle 508 on Reader Service Card

IT'S Economy ALL THE WAY!



A.G.D. PLUG &
RING GAGES

— when you order your duplication requirements for these Standard Items . . .



A.S.A.
DRILL JIG
BUSHINGS



"Economy" stocks always complete to assure immediate delivery. Worn-out plugs and ring gages salvaged at low cost.

Ask about the new "Economy" Extended O.D. Symbol Range. Dimensional Data Sheet No. 7-A Upon Request.

1827 SOUTH 68th STREET
MILWAUKEE 14, WIS.

"TRU-LOC"
Adjustable Adapter
Sleeves and Nuts

ECONOMY TOOL & MACHINE CO.

For more data circle 509 on Reader Service Card

January, 1957

modern machine shop 321

new shop equipment . . .

can be wired through the starter of the machine it serves, saving power by automatically starting and stopping with the machine.

For more data circle 129 on Reader Service Card



CARBIDE ROTARY MILL

Severance Tool Industries, Inc., 724 Iowa St., Saginaw, Mich., has announced its Ecarno-Mill. This is a carbide rotary tool which features a right-hand double cut with a left-hand spiraled tooth. It is claimed that this arrangement produces a smooth, balanced cutting action and gives opera-

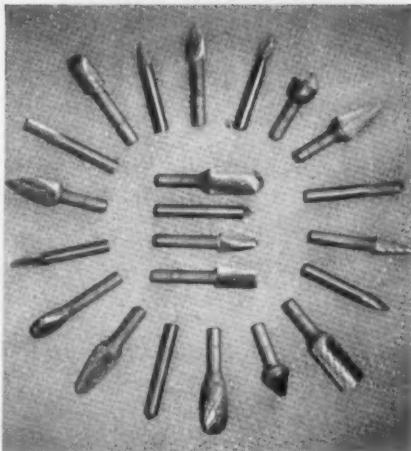


Illustration showing various types of
Severance Ecarno-Mill Carbide Rotary Tools



THESE 40-TON PRESSES

take job after job in stride and give you top speed and uniform output on a variety of work. They stress simplicity in every detail to achieve quicker set-ups, easier changeovers and simpler operation. All are extra rugged, high precision units, made to withstand hard usage and assure long, satisfactory service. They are very moderately priced.

Manufacturers of Rousselle Presses

Significant savings may result if you let our engineering staff assist you. There is no obligation.

Rousselle Presses are sold exclusively through leading machinery dealers.

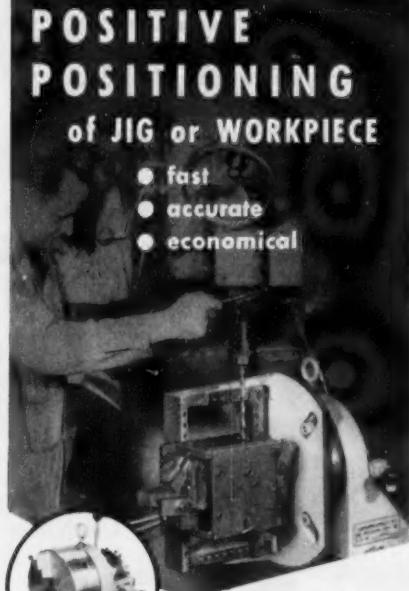
Choice of 25 models in 5 to 40-ton sizes.

SERVICE MACHINE CO. 2310 West 78th Street • Chicago 20, Ill.

For more data circle 510 on Reader Service Card

POSITIVE POSITIONING of JIG or WORKPIECE

- fast
- accurate
- economical



WITH CHUCK



WITH
RIGHT ANGLE
ADAPTOR



WITH
FACE PLATE

AVAILABLE SIZES
7", 10", 14", 18",
24"



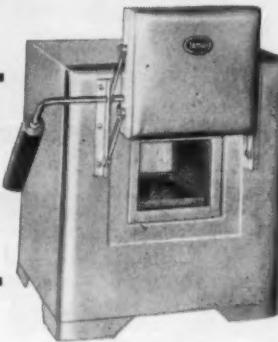
EST 1870

JOHNSON & BASSETT INC.
PRODUCTION TOOL DIVISION
WORCESTER, MASSACHUSETTS

ASK FOR BULLETIN IT7

For more data circle 511 on Reader Service Card
January, 1957

"Do-It-Yourself" Pays Off In Heat Treating



Why let someone else set your production schedules? If you now depend on outside heat treat sources, consider all the advantages of heat treating tools, dies, parts, etc., right in your own shop with a versatile TEMCO electric furnace. No bother with time-wasting pickup and delivery of work . . . no downtime while waiting for it to come back. Saves hours on jobs. Cuts costs . . . for TEMCO furnaces are economical to own and operate. Easy to hook up . . . easy to use. Eight models with chamber sizes from 4" x 3 1/4" x 3 1/4" to 9 1/2" x 8 1/2" x 18". \$65.00 to \$607.50 complete with controls. Write for data and nearest dealer's name.



ELECTRIC FURNACES
Thermo Electric Manufacturing Co.

488 Huff St., Dubuque, Iowa

For more data circle 512 on Reader Service Card
modern machine shop 323

new shop equipment . . .

tors a maximum degree of control.

According to the manufacturer, this tool should prove valuable in die, mold and pattern work, where close tolerances and skill are required, and in other applications such as deburring, finishing, machining, blending, forming and elongating.

This Ecarno-Mill is made of solid carbide and it is claimed that such

materials as abrasive plastics, aluminum, magnesium and similar materials will pose no problem.

For more data circle 130 on Reader Service Card

★ ★ ★

NOTCHER FEATURES ALL STEEL CONSTRUCTION

The J. F. Kidder Manufacturing Co., 426 Colchester Ave., Burlington, Vt., has announced the No. 48 Little Blacksmith Notcher. This machine weighs 18 pounds

and has a capacity of $\frac{1}{8}$ inch mild steel. According to the manufacturer, it can be equipped with dies for any angle up to 90 degrees and will notch 1 inch deep. The dies can be quickly changed. The body of this notcher is of all steel construction and is claimed to be unbreakable. This unit comes equipped with back gauges.

For more data circle 131 on Reader Service Card

GREEN

Model D-2

Pantograph Engraver

Unique design of the two-dimensional Model D-2 features—Single micrometer adjustment controls vertical depth of cut, and adjusts height of copy table and pantograph.

Range of ratios from 2 to 1 to infinity!

Accessibility on three sides permitting panels up to 30" diameter to be engraved, milled or profiled. Vertical range over 10" allowing operations on complete chassis, cabinets or other bulky objects.

Ruggedness, stability and precise accuracy inherent in construction.

Mounted on the ruggedly constructed heavy duty steel Green Engraver Bench. All functional parts are conveniently within reach of the operator while seated. Accessibility of master type sets stored in lower cabinet trays, tools and accessories contribute to productive capacity.

A brochure with full details is yours upon request.

Literature also available on the smaller Model 106 three-dimensional engraver.

GREEN INSTRUMENT COMPANY
392 Putnam Ave., Cambridge, Mass.

For more data circle 513 on Reader Service Card



Kidder No. 48 Little Blacksmith Notcher

1 Minute
to locate an edge within .0005"!



JUMP EDGE FINDER

PRICE \$2.50 Complete satisfaction —
or full refund.

Postage free if payment with order.

ELISHA PENNIMAN ELMWOOD 10,
CONN.

For more data circle 514 on Reader Service Card



**DRILL THESE HOLES
BY A QUICK, EASY, INEXPENSIVE METHOD**

Your business letterhead will bring literature.

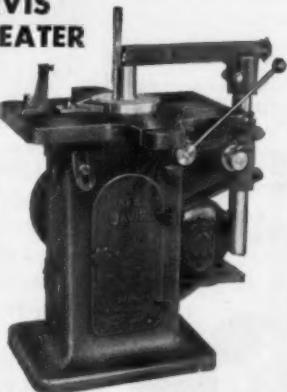
WATTS BROS. TOOL WORKS
Wilmerding, Pa.

For more data circle 515 on Reader Service Card

**Why Use A Shaper
to cut Keyways when a
DAVIS
KEYSEATER**

will
do the
job so
much
quicker
and
better?

Send
for
Circular



DAVIS KEYSEATER CO.
Exchange and Glasgow Sts.
ROCHESTER, N. Y.

For more data circle 516 on Reader Service Card

January, 1957



Miccro Spray
LAY-OUT DYE
(Purple)

MICCRO Lay-Out Dye, long the leader in its field, now available in an AEROSOL package for SPRAYING.

All the advantages—instant drying; clear, sharp lines—plus easy-to-use, dependable, efficient MICCRO Spray container.

Regular MICCRO Supreme Lay-Out and Identification Dye in seven distinctive colors available as always in brush-in-cap and conventional containers.

*Write for circular
on company letterhead*

**MICHIGAN CHROME
& CHEMICAL COMPANY**

8615 Grinnell Ave., Detroit 13, Mich.

For more data circle 517 on Reader Service Card

modern machine shop 325

new shop equipment . . .

**STUB TAP DESIGNED
SPECIFICALLY FOR USE
IN SCREW MACHINES**

A stub tap, designed and manufactured specifically for use in screw machines, has been announced by Pratt and Whitney Co., Inc., 25 Charter Oak Blvd., West Hartford 1, Conn.



Pratt and Whitney Stub Screw Machine Tap

Shorter in length, this cutting tool incorporates features which are said to eliminate most of the tapping difficulties that are encountered when utilizing conventional taps in screw machine operations.

Most notable features of the Pratt and Whitney Screw Machine Tap are a necked shank for generous lubrication; a spiral point to reduce torque and improve chip disposal; and a short thread length to counteract the tendency to produce bell-mouth threaded holes because of misalignment. Stub taps of this design have been tested in the field over a three-year period with excellent results.

Stub Screw Machine Taps are available in high-speed steel ground thread, NC or NF, plug or bottoming chamfer, in Nos. 2 to 10 machine screw sizes, to GH2 limits.

For more data circle 132 on Reader Service Card

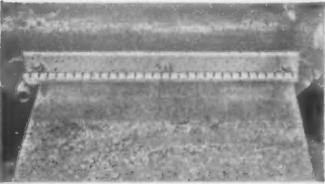
NEW, BETTER

C/R way wiper

guards the life,
cuts downtime,
saves costly
maintenance on
machine tool ways



ABOVE, lathe way badly scored through inadequate protection; BELOW, C/R Wiper keeps mill way clear, smooth.



CHICAGO RAWHIDE MFG. CO.

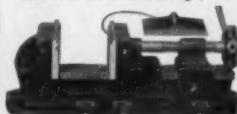
1233 Elston Avenue Chicago 22, Illinois
IN CANADA: Manufactured and Distributed by
Chicago Rawhide Mfg. Co. of Canada, Ltd.
Hamilton, Ontario.

For more data circle 518 on Reader Service Card



"KNOWN AS THE BEST"
GEM VISES

Their "Versatility" and "Quick-Action", without use of cumbersome wrenches, will soon repay their cost in time-savings, safety and convenience.



J. E. MARTIN MACHINE CO.
P. R. B. & State Springfield, Ohio

For more data circle 519 on Reader Service Card

**Accurate Hole Transfer Made Easy With
NIELSEN TRANSFER SCREWS**

Simply Insert In holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. B sizes, from $3/16''$ to $3/4''$ U.S.S. Inexpensive — Last for years.



**NIELSEN TOOL &
DIE COMPANY**
P. O. Box 1067
Berkley, Mich.

For more data circle 520 on Reader Service Card



Use KASENIT SURFACE HARDENING COMPOUND
**FOR BEST RESULTS ON YOUR TOOLS, DIES
AND MACHINED COMPONENTS**
NON-POISONOUS — NO SPECIAL EQUIPMENT

Available from Leading Hardware and Mill Suppliers
in 1 lb., 5 lb., 10 lb., 25 lb., 50 lb. and 100 lb. containers.

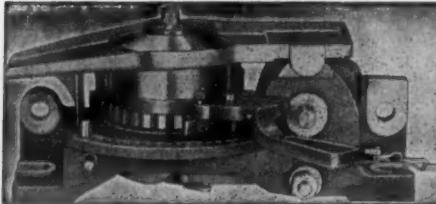
KASENIT COMPANY
3 KING ST. MAHWAH, N. J.

Journal of Health Politics, Policy and Law, Vol. 35, No. 4, December 2010
DOI 10.1215/03616878-35-4 © 2010 by The University of Chicago

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MAHWAH, N. J.

For more data circle 521 on Reader Service Card



D E A R B O R N

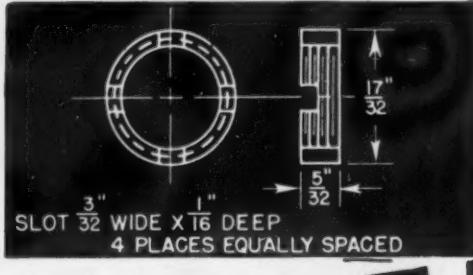
Automatic Chucking and Indexing Fixture

FEATURES:

1. Work held by collets
 2. Automatic opening and closing
 3. Work automatically ejected
 4. Automatic indexing if required
 5. Three models with capacities from $1\frac{1}{32}''$ to $2''$.

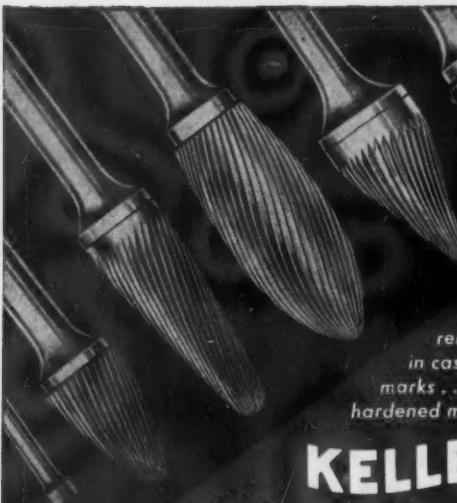
J. W. DEARBORN
ANSONIA • CONN.

For more data circle 522 on Reader Service Card



Write for illustrated data. Send blue-prints or specifications of work.





When Mistakes Happen . . .

— and they do in every shop —
you'll find that the ideal tools for
removing excess welds . . . blending
in castings or molds . . . removing tool
marks . . . or putting keyways into
hardened metal parts . . . are —

KELLERFLEX® CARBIDE BURS . . .

AVAILABLE FROM STOCK IN A COMPLETE RANGE OF
SIZES AND SHAPES AT THE P&W BRANCH OFFICE NEAR YOU.

For more data circle 523 on Reader Service Card

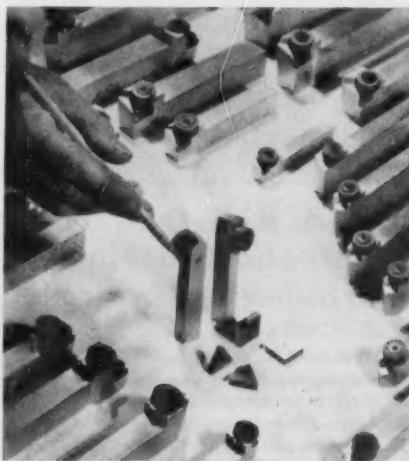


new shop equipment . . .

TOOLHOLDERS FOR USE WITH THROW-AWAY TYPE BLANKS

A line of toolholders for use with throw-away type cemented tungsten carbide blanks has been announced by the Carmet Division, Allegheny Ludlum Steel Corp., Oliver Building, Pittsburgh 22, Pa. Toolholders of this kind are used with carbide throw-away blanks in the machining of metal and other materials. Small carbide tips, designed to give a large number of sharp cutting surfaces, used in these holders are easily indexed to a new cutting surface while holding the tool location. Throw-away blanks are said to eliminate the need for regrinding sharp edges to cutting tools.

The Carmet Toolholders, which are available in more than 90 styles and sizes, have the following advantages:



Carmet Toolholders for use with throw-away type cemented tungsten carbide blanks

a gripping design which exerts cutting pressure in the same direction as the

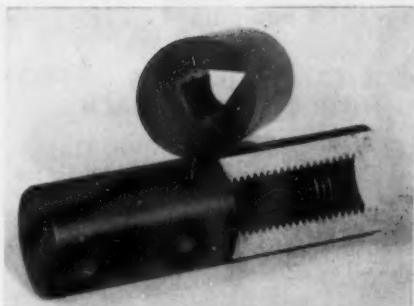
clamp screw is used. This screw is accessible from both the top and bottom of the holder, advantageous when using a rear tool carriage. This is accomplished by the use of a special screw with recessed heads at both ends; the Carmet Toolholders are cadmium plated to resist corrosion. All toolholders have replaceable carbide chip breakers which are claimed to insure long economic life for the holder.

For more data circle 133 on Reader Service Card

★ ★ *

TWO NEW SIZES ADDED TO LINE OF BORING BAR ADAPTORS

In order to accommodate $\frac{1}{4}$ and $\frac{3}{8}$ inch Inscribed Circle Solid Carbide Triangular Inserts, Weddell Tools, Inc., 37 Centennial St., Rochester 11, N. Y., has added two new sizes to its line of boring bar adaptors. These



View showing Weddell Boring Bar Adaptor

sizes, known as TB8 and TB12 in the carbide industry, are commonly used in turning toolholders. Cylindrical adaptors with broached triangular holes are now available for use in boring tools and special holders. They are pressed, sweated or brazed in drilled or reamed holes.

For more data circle 134 on Reader Service Card

★ ★ ★ ★ *

teamed with a KELLERFLEX® FLEXIBLE SHAFT MACHINE

Finest, most dependable machines for burring, filing, sanding, grinding, polishing, wire brushing... and many other jobs. Easy to use... operator holds only the light handpiece... powerful motor is supported by stand. Versatile "Series M". Machines provide 16 speed changes.

Available with $\frac{1}{2}$ to 1 hp. motors.

Convertible stand provides floor stand, bench or suspension mounting.

Write
for complete
information on
KELLERFLEX Burs or
Machines. Pratt & Whitney
Company, Incorporated,
25 Charter Oak Boulevard,
West Hartford, Connecticut



PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS



For more data circle 524 on Reader Service Card

new shop equipment . . .

**TOOL CAN BE USED AS
PUSH OR ROTARY BROACH**

Shearcut Tool Co., 7045 Darby Ave., Reseda, Calif., has announced its Dual Purpose Push Broaches. They are dual purpose tools which are produced as stock items and can be shipped from stock to rapidly fill cus-

Shearcutter Dual Purpose Push Broach

tomers orders. They can be used as conventional push broaches, in punch presses, hydraulic presses, turret and regular lathes. They can also be used as rotary broaches, in machines in which the part or tool rotates, and are particularly useful in the finish broaching of long holes.

Designed to remove from 0.005 to 0.015 inch of stock in the hole finishing operation, they are said to provide an unusually fast method of finishing holes to exact size through a shear-cutting action. Multiple spiral flutes provide a continuous cutting action and these tools may be used to finish holes that have internal grooves, such as hydraulic valve bodies, bushings and various other items.

According to the manufacturer, Shearcutter Push Broaches are easily resharpened when dulled through use. No special tools or fixtures are required for the resharpening operation. These tools are carried in

**the NEW
SPEEDWAY
cut-off tool**

- eliminates overhang problems
- increases cutting speeds
- saves in labor, material, power, tool and spindle wear

This new, patented tool provides savings in cutting time, blade replacement and power. The unique construction eliminates the overhang problem by supporting the cutting edge by tension vertically. This permits a much thinner blade in relation to depth of cut. For example, for cuts up to $4\frac{1}{4}$ ", the blade is .095" thick. Much less heat is created. Blades and holders are available for cuts up to $4\frac{1}{4}$ ". Sharpening is accomplished easily with one or two passes over any tool grinding wheel. The tool is especially stable on interrupted cuts.

For complete details, write Dept. MMS-1

WYE-STANLEY TOOL CO.
3503 E. OLYMPIC BLVD.
LOS ANGELES 23, CALIF. P. O. BOX 5245
CLEVELAND 1, OHIO

Blades
available in
.0625" and
.095"

For more data circle 525 on Reader Service Card

**LIVE CENTER
ACTION WITH
DEAD CENTER
ACCURACY**

USE



**ANTI-SCORING
LUBRICANTS**

**PROVE IT TO
YOURSELF IN
YOUR OWN PLANT FOR ONE
DOLLAR AND THIS COUPON!**

Free-running on dead centers—with COMPLETE protection. CMD Lubricants are CONCENTRATED, form a "tough" film—absolutely NO GALLING or SEIZING—under the heaviest load. STABILIZED for added "oiliness" giving longer, smoother runs without slip-stick action. It all adds up to LIVE CENTER ACTION with DEAD CENTER PRECISION. The bigger the job, the better you'll like it.



**TRIAL ORDER—
TWO FOUR OZ. TUBES \$1.00**

Send me my order of CMD right away!
Bill me Bill my company

Name_____

Company Name_____

Address_____

City_____ State_____

Chicago Manufacturing and Distributing Co.
1910 West 46th St., Chicago 9, Illinois

**CHICAGO MANUFACTURING
AND DISTRIBUTING CO.**

For more data circle 526 on Reader Service Card

January, 1957

*You can easily
remove broken
pipes, studs and
screws that defy
movement...*



**WITH REPS PIPE &
STUD EXTRACTORS
MAKES STRONG FOUR POINT
GRIP WITHOUT HAMMERING**

A Specialized Tool
that makes a strong
bite, pulling rather
than reaming.
Hardened steel
will remove any
material.



Ten sizes: for every
pipe $\frac{1}{8}$ " to 2",
every stud and
screw $\frac{3}{8}$ " to $3\frac{1}{2}$ ".

Write us, or simply attach
this advertisement to
your letterhead, to
receive descriptive Data
Folder #10, giving sizes,
prices, and complete
specifications of all
**WALTON Specialized
TOOLS.**



**The WALTON Company
HARTFORD 10, CONN.**

For more data circle 527 on Reader Service Card

new shop equipment . . .

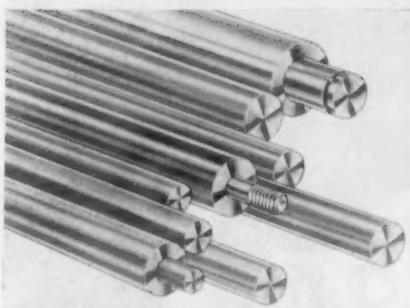
stock in sizes from $\frac{1}{8}$ to 1 inch diameter in increments of $\frac{1}{32}$ inch.

For more data circle 135 on Reader Service Card

★ ★ ★

HARD STEEL RODS, SHAFTS AND ROLLS

Thomson Industries, Inc., Manhasset, N. Y., has announced the standardization and availability of a new type of industrial material which has been designated "60 Case." This designation covers long, round, hardened bars for use as guide rods, shafts, rolls, piston rods, axles and so on. Material is AISI 1060 Steel which has a surface hardness close to 60 on the Rockwell C scale and is precision ground to standard diameters.



Parts made from Thomson "60 Case" Material

Initial standard sizes range from a nominal diameter of $\frac{1}{4}$ inch to 4 inches. The maximum length varies from 8 to 14 feet, depending on the diameter. The depth of hardness ranges from 0.040 inch minimum in the smallest diameter to 0.100 inch minimum in the largest diameter.

For more data circle 136 on Reader Service Card

PART FEEDER

Automatic Part Feeders are adaptable to production jobs requiring the handling of small parts. Parts poured into hopper are arranged and fed down track in proper order.

Single & Multiple Spindle Magazine Feed Power Screw Driving Machines

For driving screws faster in products assembled with screws. These machines operate easily and require very little attention or adjustment when put in production.

Send sample parts when writing for quotation.

COOK & CHICK CO.

2415 WEST 24TH ST., CHICAGO 8, ILL.

For more data circle 528 on Reader Service Card

332 modern machine shop

**SAVE
OVER
20% on
Diamond
Wheels**

Spra-Kool

COMpletely **A**daptable — no bulky equipment. Easily installed on any make of machine. **S**IMPLE **S**PRAY **A**djustment — from fine dry to heavy moist spray . . . no fuss or muss. **T**WO **M**ozzles — round-type for spot concentration, flat-type for wide coverage. **V**ERSATILE — uses water soluble or oil base coolants. Simple air hose connection. **E**CONOMICAL — only \$37.00 complete . . . pays for itself in a few weeks. Includes container, fittings, hose, tubing.

Write For Free Bulletin —

BAR PRODUCTS CO.

3705 Highcrest • Rockford, Illinois

For more data circle 529 on Reader Service Card

January, 1957

Piloted
Special Lengths
Special Diameters
Combination Cutting



CARBIDE REAMERS STRAIGHT OR TAPER SHANK

Send drawings for Prompt Quotations

SCHMARJE TOOL COMPANY

Carbide Reamers • Form Tools
MUSCATINE 3, IOWA

For more data circle 530 on Reader Service Card

... THE RIGHT
ONE FOR
YOUR
JOB

put a **GRAYMILLS** Coolant System

on that machine
for **LONGER LIFE...**
BETTER FINISH...
FASTER CUTTING

Standard Packaged Units are
available from your nearby
INDUSTRIAL DISTRIBUTOR



GRAYMILLS CORPORATION
3769 N. LINCOLN AVE., CHICAGO, 13, ILL.

Write for Catalog

GRAYMILLS

Superfls COOLANT PUMPS AND UNITS



For more data circle 531 on Reader Service Card

Grind tools, metals quickly on **OLIVER** machines

Keep tools in tip-top shape with an Oliver Oilstone Tool Grinder (right). Coarse and fine oilstones with adjustable tilting table and tool holder. Dry emery wheel with toolrest, emery cone, leather stropping wheel. Write for Bulletin No. 585.



OLIVER DISK GRINDERS

Used by leading metalworkers. Has 15-in. aloxite disk to finish plastics, brass, aluminum and alloys. Segment and duplicating gauge, angle gauge. Available with 6-in. Belt Grinding attachment. Oliver also makes single and double disk Grinders of larger capacity, finer adjustments and gauges to grind difficult work. Write for details.

OLIVER MACHINERY COMPANY
Established 1890 GRAND RAPIDS 2, MICHIGAN

For more data circle 532 on Reader Service Card

January, 1957

modern machine shop 333



Get this folder on newest
Metalworking Machines—



new shop equipment . . .

REDESIGNED FLOOR RIVETERS

The Lemert Engineering Co., Inc., 201 East Jefferson St., Plymouth, Ind., has announced the redesign of its two Airflex vertical floor series riveters to include an adjustable anvil, fabricated steel base and a sound deadening chamber for exhaust air.

Both the manual foot pedal model and the electrically-operated and timed model, each in a series of five capacity sizes, have the new features of compact and attractive appearance, rapid gap adjustment and sound control. The series is designated "ANB" followed by the customary -50, -75, -100, -125 and -150 size codes covering a range of rivet capacities from 1/32 to 1/2 inch, based on solid mild steel. Belt guard is optional equipment.

Otherwise, the units are of the Airflex original spin-impact design as former models, combining spindle rotation at 500 r.p.m. and impact rates to 16,000 b.p.m. Performance-wise, the machine is said to be capable of heading both solid and hollow rivets with-

**NEW
from
ELGIN**

Golden Circle

SOLID CARBIDE DRILLS and REAMERS

—precision machine ground.	—complete size range	—quality
	In stock,	proved by
	specials	Elgin for
	available.	accuracy and long life.

WRITE TODAY for details on this latest addition to Elgin's "Golden Circle" Rotary Tool Line of solid carbide burs and end mills.



**ABRASIVES DIVISION, DEPT. P
ELGIN NATIONAL WATCH COMPANY**

Elgin, Illinois

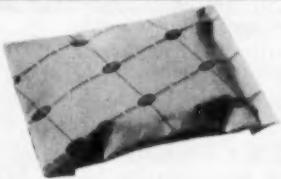
For more data circle 533 on Reader Service Card



Lemert Airflex Vertical Floor Riveter

WHY
YOU
SHOULD
USE

JIFFY PADDED SHIPPING BAGS for Your Product



→ **SPEED**—Nine seconds is all it takes to pack a product for shipment. Insert item—staple or tape. It's ready to go!

→ **PROTECTION**—Thickly cushioned, inexpensive Jiffy Bag is all the protection your product needs. It takes the place of boxes, fillers, overwraps.

→ **ECONOMY**—You can save up to 76% packing time by switching to JIFFY BAGS. Eliminate overtime. Meet delivery schedules with money-saving, time-saving JIFFY BAGS.

Write today for samples and prices.

JIFFY MANUFACTURING CO.

377 FLORENCE AVE., HILLSIDE, N. J.

For more data circle 534 on Reader Service Card
January, 1957

THE

Luma

WAY



for . . . PRODUCTION SOLDERING

Handles numerous soldering jobs from fine precision to medium-heavy industrial. More than 16 styles of electrode holders to fit individual soft or hard soldering operations.

From 6 to 30 stages of heat with a selector switch used in conjunction with 3 secondary terminals.

A wide range of power—5 to 2500 watts—quickly supplies concentrated heat at exact area—insures perfectly soldered joints with maximum Speed, Safety, Flexibility and Economy.



for . . . ETCHING & DEMAGNETIZING

Marks the hardest steel, stainless steel, steel alloys or carbides with the ease and legibility of a pencil. 4 types of interchangeable marking points available to serve every purpose. 6 to 36 distinct marking heats. Easy to operate. Two tools in one. Demagnetizes over a 4 to 8-inch width. Especially valuable when tools have been in contact with magnetic chuck.

Write for New Catalog descriptive of all model Solder Tools, Etch-tools, Demagnetizers . . . today.



THE LUMA
ELECTRIC
EQUIPMENT CO.

P.O. Box 132-MS • Toledo, Ohio

For more data circle 535 on Reader Service Card

modern machine shop 335



GEARS

In Stock—Immediate
Delivery

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.

Send for Complete Catalog No. 20

CHICAGO GEAR WORKS
440-50 N. Oakley Blvd., Chicago 12, Ill.

For more data circle 536 on Reader Service Card

new shop equipment . . .

out cracking, chipping or flaking in parts of ordinary materials or fracturable plastics, glass and ceramics. Models include $\frac{1}{4}$ h.p., 110 volt motor, positive switch, belt, anvil, blank rivet rest and peen and spanner wrench.

For more data circle 137 on Reader Service Card

★ ★ ★

JIG AND FIXTURE COMPONENTS

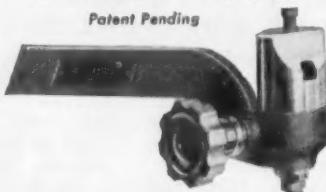
Northwestern Tool and Engineering Co., 119 Hollier Ave., Dayton 3, Ohio, recently announced its ability to furnish from stock the regular knurled shaft type with a hexagon socket, the knurled head type with a hexagon socket, or the hand knob type with a hexagon socket.

According to the manufacturer, all types can be used with either the large or small diameter shoe or with the adjustable vee pads, as shown in the accompanying illustration. Each of these types is available in $\frac{1}{4}$ -20, 5/16-18, $\frac{1}{2}$ -13 or $\frac{5}{8}$ -11 thread sizes. They are available in lengths from 1 inch up to and including $5\frac{1}{4}$ inches.

For more data circle 138 on Reader Service Card

**Monarch Precision
SHA PLANE
Radius Tools**

Patent Pending



Five Models for

**LATHES, SHAPERS, PLANERS,
AND BORING MILLS.**

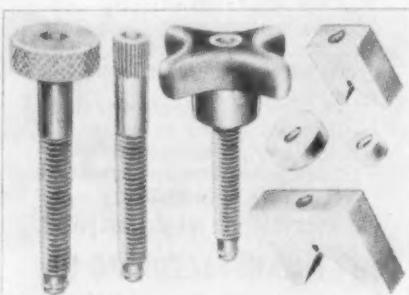
RANGE $\frac{1}{8}$ " TO 3" RADIUS (MODELS ALSO AVAILABLE FOR CONVEX CUTTING, AND CONCAVE RADII TO 6" ON PLANERS, ETC.)

**C. B. TEETER
Tool Room Specialties**

**4470 Oakenwald Ave., Chicago 15, Ill.
Phone Drexel 3-3571**

For more data circle 538 on Reader Service Card

336 modern machine shop



Northwestern Jig and Fixture Components

January, 1957

THE BENDER'S WORKHORSE:

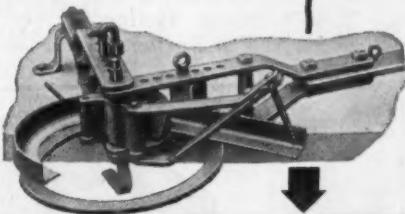
HOSSFELD UNIVERSAL[®] IRON BENDER

141 DIFFERENT DIES MAKE IT
THE MOST VERSATILE OF ALL BENDERS

For maintenance and limited production work, a Hossfeld Universal Iron Bender will bend rounds, flats, squares, angle iron, pipe, tubing and conduit. Only one man and one machine are needed. Practical and adaptable, it is quickly set up. Wrenchless, it's always ready for use. Special bending equipment is unnecessary.

OPTIONAL EQUIPMENT AVAILABLE MAKES THE
JOB EVEN EASIER

Special dies bend angle iron flange in or out, flat stock edgewise, round or square eyes on flat stock, O.D. tubing, thin wall conduit, 180° and feed—along pipe bends. A Hydraulic Attachment enables one man to make hard-to-pull bends on heavier material.



GET THE FACTS!

Write for bulletin showing
bender models, standard
and special dies, and illus-
trations of bends.

HOSSFELD MFG. CO.

402 W. 3rd St.

Winona, Minn.

For more data circle 539 on Reader Service Card

The ONLY Live Center On Which
Points May Be Interchanged to $\pm .0001$

Points Must Be
Ordered With
LIVE CENTER
To Achieve This
Degree Of
Accuracy.



Empire Live Centers

Quality engineered for use on lathes, grinders, and milling machines . . . Empire Live Centers are versatile, accurate, heavy duty. Tapered seats give consistent precision alignment . . . assure accuracy of .0001. Positive seal eliminates dirt, grit, cutting oils. Combination bearings absorb both radial and thrust loads.



Manufactured in all tapers:
Morse, Brown & Sharpe,
Jarno, and straight shank.
Special shanks and points
to order.

Empire Toolmaker's Set
available in handrubbed
American Walnut case.



Ask your local distributor or
write direct for 26-page Cata-
log on Live Centers, Collets,
Internal Collets, Draw Bars,
and Turret Tool Posts.

ROYAL PRODUCTS, 84 Union Street, Mineola, L. I., N. Y. Pioneer 6-4245

For more data circle 540 on Reader Service Card

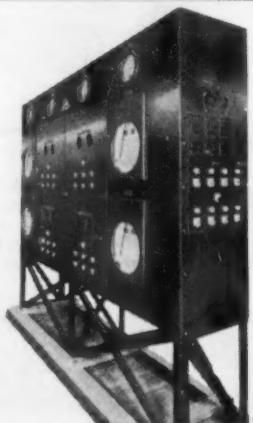
new shop equipment . . .

LINE OF INDUSTRIAL PRECISION GRINDERS

A complete line of "light-heavy-weight" industrial precision grinders and a dust collector have been introduced by the Walker-Turner Division, Rockwell Manufacturing Co., Dept. WL-22, 400 North Lexington Ave., Pittsburgh 8, Pa. Engineered for acc-

curacy and long life, this line includes a 6 inch bench grinder, 6 inch carbide tool grinder, 7 inch tool grinder and a big-capacity surface grinder—in addition to the dust collector.

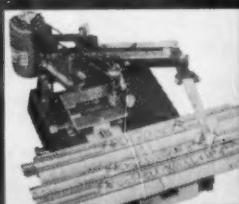
The six inch carbide tool grinder is claimed to offer time and cost savings in shops that use carbide-tipped cutting tools. Big cast-iron tables, riding on widely-spaced trunnions for maximum rigidity in operation, facilitate vibration-free true grinding. Tables tilt 30 degrees in and 45 degrees out to permit wet or dry grinding at any angle. A conveniently located, six-pole reversing switch instantly reverses the rotation of the wheel, making it possible to do all grinding on the downward motion of the wheel. Other features include dynamically balanced aluminum wheel flanges, drilled for mounting either silicon carbide or diamond wheels; miter gage with adjustable face plate; and fully enclosed type sealed-for-life grinder duty motor.



THE \$20,000 DELAY

For want of a simple nameplate, the Automatic Temperature Control Co., Philadelphia, had to hold up shipment of \$20,000 in control equipment.

Now, a portable Engravograph (size of a typewriter) makes individual nameplates on the premises. Cost, per label, less than 50¢—with unskilled labor.



Engravograph

Keeps skilled labor at
skilled jobs. Solves many marking prob-
lems. 16,000 now in use. Pays for itself.

WRITE FOR LITERATURE DEPT. NO. IM-27

new hermes Engraving Machine Corp.

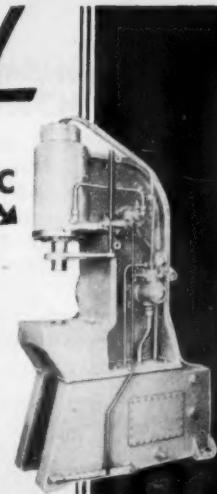
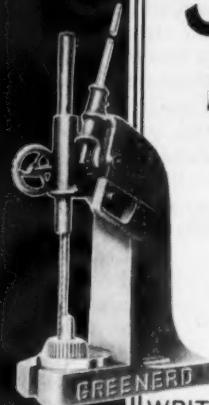
13-19 University Pl. New York 3, N.Y.

January, 1957

Greenerd

PRESSES

ARBOR & HYDRAULIC



for . . .

- ASSEMBLING
- BROACHING
- FORMING
- STRAIGHTENING

Rack and Pinion Arbor Presses.
Hydraulic presses made to conform to J.I.C. standards. Pictured at right is 15-ton hydraulic press.

WRITE FOR GREENERD CATALOGUE # 554

Greenerd ARBOR PRESS CO.

41 CROWN ST. NASHUA, N.H.

For more data circle 541 on Reader Service Card

People work better when they SEE BETTER®



At SKF Industries, Inc.

Magni-Focuser helps in conversion of wire into "points" for ball-point pens.

MAGNI-FOCUSER'S

matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

MAGNI-FOCUSER

SPEEDS PRODUCTION

With Third Dimensional (3-D) Vision
Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents. Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

EDROY PRODUCTS CO.

480 Lexington Ave., Dept. P, New York 17, N.Y.

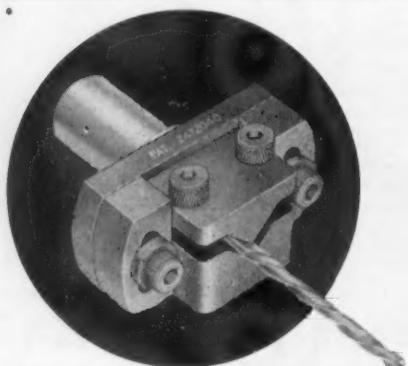
For more data circle 542 on Reader Service Card

new shop equipment . . .

specially designed motor with extra-long shafts, providing ample clearance between wheel and motor. Oval-shaped end bells make possible full use of the side of the wheel in addition to giving the shaft unusually rigid support. Thin, streamlined motor design affords clearance for grinding long pieces with both wheels. Lu-

bricated-for-life ball bearings are double-sealed to keep out harmful abrasive dust; and advanced safety features—including double-strength, shatter-proof glass safety shields; heavy cast iron guards; removable steel side plates; adjustable spark deflectors and integral dust chutes—all add to the safety of this grinder.

The surface grinder combines accuracy, simple set-up and unusually low cost. A big-capacity grinder, it offers the extra ability to do chip-breaker and tool and cutter grinding. It is said to be capable of doing more than 90 per cent of the precision grinding operations encountered in most shops. Other features include bronze ring-oiling spindle bearing; column with 360-degree swivel, $\frac{1}{2}$ by $\frac{1}{2}$ inch key and adjustable gib; vertical feed screw with no backlash, and spindle adjustment in vertical plane; cross slide which can be locked to base when transverse travel is not required, protected by canvas covers; longitudinal table slide; motor and spindle pulleys fully machined for concentricity of pitch diameters with bore, also dynamically



in half the time

Brookfield Tool Holders make tool set-ups easy!

Now, without bushings or collets, on the first try you can set up drills, counterbores, reamers or cutters for almost any machining operation. Precision ground V-jaw vises, Brookfield Tool Holders make even toughest set-ups a cinch. With one wrench, insert the tool, tighten the jaw, then float the tool into dead center position and tighten. It's as easy as that!

FREE! Descriptive illustrated brochure, plus price and specification lists.

BROOKFIELD, INCORPORATED

STOUGHTON 1111, MASSACHUSETTS

For more data circle 543 on Reader Service Card

**WHAT'S
YOUR
ENGRAVING
PROBLEM**



- Need greater speed for engraving light and medium characters . . . use Preis-Panto Model UE or UE-2.
- Does work require heavy duty machines . . . use Preis-Panto Model UE-3.
- Marking metal of extreme hardness, electrical or diamond drag . . . use Preis-Panto UE-M or UM.
- Preparing hardened steel or glass for acid etching ask for Preis-Panto Model UA-M.

Preis is the "one source" solution for your engraving problems. Complete line of accessories and attachments are available for all makes and models.



There's a Model available to solve all your particular problems economically.

TRADE MARK



H. P. PREIS ENGRAVING MACHINE CO.
657 U.S. Route 22 • Hillside, N. J.

Write for complete details and prices.
For immediate attention write directly
to manufacturer below. Ask for nearest
representative.

For more data circle 544 on Reader Service Card

No. 95 HYDRAULIC PUNCH



Capacity: 12½ ton. 20 strokes per minute, $\frac{5}{8}$ " hole thru $\frac{1}{4}$ "— $\frac{7}{8}$ " hole thru $\frac{3}{4}$ " and 2" hole thru $\frac{1}{8}$ " iron. 10" depth of throat. Floor space 14 $\frac{1}{2}$ " x 25"—weight 450 lbs. Tool operated by foot treadle from the front. Operator has complete control over descent of punch. Punch unit can be placed above, below, or at either side. Standard 1½ H.P.—1750 RPM Motor. Available in 110-220 volt single phase or 220-440 volt thru phase. Also made in an enclosed cabinet model and known as No. 95A. Write for catalogue.

W. A. WHITNEY MFG. CO.
640 RACE STREET • ROCKFORD, ILL.

For more data circle 545 on Reader Service Card



- Write today for literature on complete line of Huppert furnaces and ovens in floor and bench models.

- Ask for hints on Heat Treating.

For Heat Treating Small Parts

HUPPERT

DeLuxe ELECTRIC FURNACES

Here's a series of compact, durable furnaces that are ideal for tool and die shops and small laboratories. Any desired temperature within the range of 300° to 1900° F. is controlled by an accurate,

built-in Huppert temperature controller. All-steel construction—multi-insulation—sturdy Kanthal elements—counterweighted doors—removable porcelain tray.

Model No.	Inside Dimensions			Temp. Range	Watts 110 Volts AC	Price
	Wide	High	Deep			
434DL	4 $\frac{1}{4}$ "	3 $\frac{1}{8}$ "	4 $\frac{1}{4}$ "	300°-1600° F.	920	\$ 86.00
439DL	4 $\frac{1}{4}$ "	3 $\frac{1}{8}$ "	9"	300°-1600° F.	1650	115.00
436DL	4 $\frac{1}{4}$ "	3 $\frac{1}{8}$ "	6"	300°-1900° F.	1650	115.00
5DL	4 $\frac{1}{4}$ "	3 $\frac{1}{8}$ "	9"	300°-1900° F.	1750	176.00
9DL	6"	6"	6"	300°-1900° F.	2200	200.00
669DL	6"	6"	9"	300°-1900° F.	3000	248.00
10DL	8"	4 $\frac{1}{4}$ "	6"	300°-1900° F.	2000	220.00
849DL	8"	4 $\frac{1}{4}$ "	9"	300°-1900° F.	3000	265.00

Available for 220 Volt AC at small additional cost.
Stainless steel housing slightly higher.

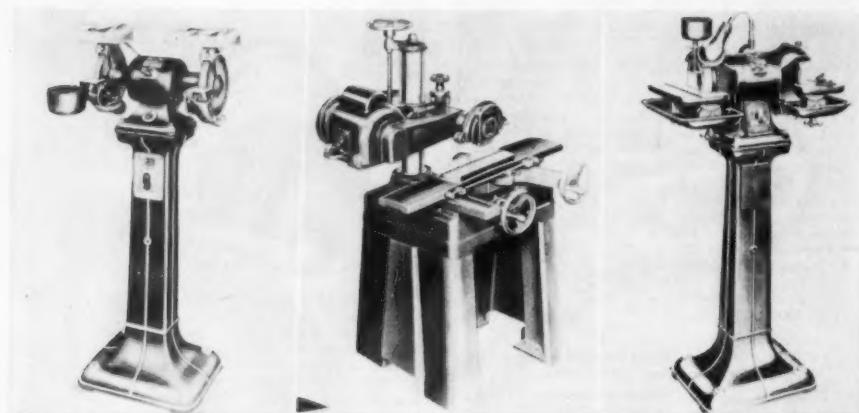
K. H. HUPPERT CO.
6841 COTTAGE GROVE AVENUE,
Manufacturers of Electric Furnaces and Ovens
CHICAGO 37, ILLINOIS

For more data circle 546 on Reader Service Card

January, 1957

modern machine shop 341

new shop equipment . . .



(Left) 7-Inch Tool Grinder, (Center) Surface Grinder and (Right), 6-Inch Carbide Tool Grinder—all part of Walker-Turner "light-heavyweight" line of precision grinders

balanced; specially selected motor balanced with motor pulley and machine to assure harmony of entire unit for smooth, accurate work.

The six inch bench grinder takes up minimum space for grinding, polishing and buffing. Balanced grinding wheels and precision-ground shaft provide smooth, accurate performance.

The dust collector features a strong, pressed steel cabinet, removable filter and enclosed 1/3 h.p. motor that is said to move 350 cubic feet of air per minute. The unit is compact and port-

able. The motor is in a separate, dust-proof compartment and runs on lubricated-for-life ball bearings. A large door at the back of the unit provides quick access to the fireproof, cleanable, long-lasting filter, and a door at the top facilitates inspection of the motor. The fan is a high-efficiency squirrel-cage type that develops static suction of 3 inches of water. Larger particles sucked up by the fan fall into a pan at the bottom and are easily removed.

For more data circle 139 on Reader Service Card

An advertisement for DYKEM Steel Blue. On the left, there's a drawing of concentric circles with the word 'SPECIMEN' written below them. Next to the drawing is a can of DYKEM Steel Blue. The text 'With DYKEM Steel Blue' is written above the drawing, and 'Without DYKEM Steel Blue' is written below it. To the right of the drawing, the text 'DYKEM STEEL BLUE' is written in large letters, followed by 'Stops Losses' and 'making Dies and Templates'. Below this, there's a block of text: 'Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.' At the bottom right, it says 'Write for sample on company letterhead THE DYKEM COMPANY 2301F North 11th St. • St. Louis 6, Mo.'

For more data circle 547 on Reader Service Card

**Extra Capacity with
hall COLLET CHUCKS**

for
SPEED,
ACCURACY,
ECONOMY



Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over. Tremendous grip over or under stock size. Without adjustments. Shortest overhang. All grip...no slip. No bearings...no heat or lost power. Instant release without stopping lathe. SATISFACTION GUARANTEED!

Made in Three Sizes to Fit Your Requirements:

Model A...1" (max. capacity 1-1/16")

Model B...2" (max. capacity 2-1/16")

Model C...3" (max. capacity 3-1/4")

Write today for illustrated catalog and price list—Dept. B-1

HALL MANUFACTURING COMPANY

625 TULAROSA DRIVE, LOS ANGELES 26, CALIFORNIA

For more data circle 548 on Reader Service Card

**MOVE Any Machinery to 150 Tons
with LESS EFFORT by EXPRESS ROLLERS**



**SAVES WORK
USED WIDELY
RUGGED-SAFE**

★ FIVE ranges of sizes: from 2 to 150 ton load capacity.

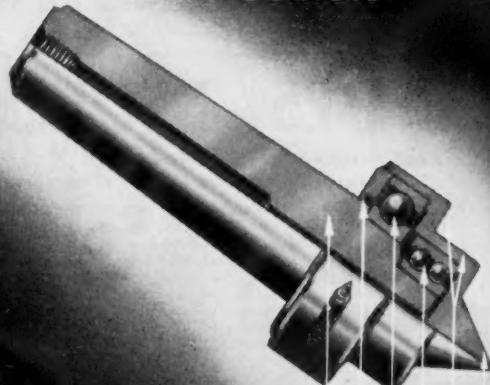
★ IDEAL for shop, dock, freight operators. Handle, turn plate available little extra cost.

★ 2-TON CAPACITY. Set of 4 recommended. \$25 per unit. 150-Ton. 4 advised. \$175 each unit. (New Bar-Lugger also available)

write INDUSTRIAL EAST CO.
P.O. Box 561, Clifton 2, N. J.

For more data circle 549 on Reader Service Card

**ENGINEERED
Live Centers**



Standard shanks with Morse tapers carried in stock... send us your specifications and blueprints... we will see that your job is set up with the right LIVE CENTER.

SHANK
GREASE SEAL
LARGE THRUST BEARING
LARGE RADIAL BEARING
CUSHION ACTION
GROUNDED TRUE-UP BEARINGS

STURDIMATIC
TOOL COMPANY

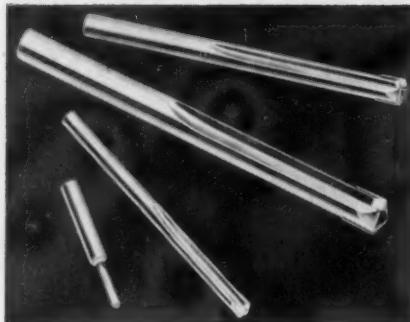
1904 F STREET • DETROIT 16, MICH.

For more data circle 550 on Reader Service Card

new shop equipment . . .

STANDARD LINE OF DRILLS IS EXPANDED

Ace Drill Corp., Adrian, Mich., recently announced that its "Hi-Brinell" Drills, designed for use in drilling hardened ferrous materials with a Rockwell range of C 40 to C 65 and above, are now available from stand-



View showing Ace "Hi-Brinell" Drills

**GRIND THE
*Eastern Centerless
Way***

Our new plant with increased facilities assures

PROMPT SERVICE

Eastern Centerless Grinding Co.

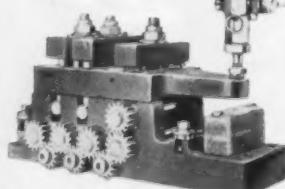
470 Tolland Street East Hartford 8, Conn.

For more data circle 551 on Reader Service Card

ard stock in additional sizes ranging from 1/16 to 3/4 inch. Said to be ideal for many toolroom, die shop and machine repair applications, "Hi-Brinell" Drills are produced in two different styles to cover the complete size range. Drills from 1/16 to and including 1/8 inch have a solid carbide insert brazed into a cylindrical tool steel shank. Sizes from 3/16 to and including 3/4 inch are equipped with a carbide tip brazed into a tool steel shank having a straight flute. Points of both types

2" wide \$225.

4" wide \$310.



increases production 25% with Stock Straighteners!

Uses coil instead of strip material.

Saves space! Stops trouble in pressroom!

The only low cost stock straightener with all these features:

1. WILL NOT BUCKLE THIN MATERIAL, because it is pulled not pushed, over the rollers, has successfully straightened Inconel, Stainless Steel, Platinum, Phosphor Bronze and Beryllium Copper.
2. GEAR DRIVEN LOWER ROLLERS AND PRESSURE ROLLERS cuts feeding pressure, protects prepainted and preplated material.
3. BUILT IN STOCK OILER cleans and oils material in one operation.
4. GUARDS protect all moving parts.

CAN BE SUPPLIED WITH AUTOMATIC FEED FOR PRESSES, at low cost.

CAPACITIES:

2" wide: .010 to .065 in steel, to .093 in soft material.

4" wide: .010 to .048 in steel, to .065 in soft material.

CAN BE SUPPLIED IN MANY MODELS, motor drive, etc., write for full information, catalog and prices on other models.

SPERMAN METAL SPEC.

2199 E. 21st St.

Brooklyn 29, New York

ORDER DIRECT, on our ten day money back guarantee

For more data circle 552 on Reader Service Card

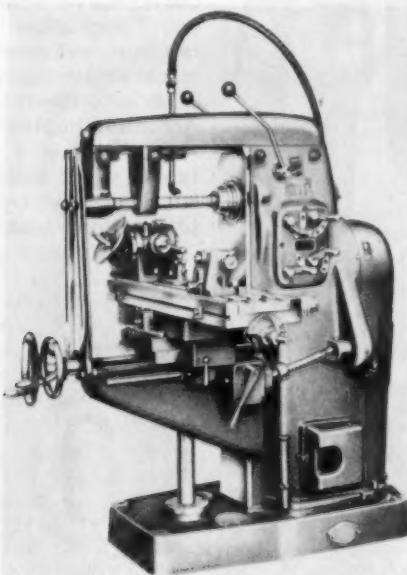
feature ample negative rake to eliminate thin projecting angles, increase drill ruggedness, and permit faster, easier penetration of the work. In addition to the new sizes now included in its standard stock line, the company will continue to produce "Hi-Brinell" Drills in special sizes to meet specific application requirements.

For more data circle 140 on Reader Service Card

★ ★ ★

MILLING MACHINE IS BUILT FOR AVERAGE CAPACITIES

Aaron Machinery Co., Inc., 45 Crosby St., New York 12, N. Y., has introduced the Pedersen Model VPU-1 Milling Machine. This milling machine has been built for average capacities and is said to embody all of the automatic features of heavier milling machines. Automatic feeds in three directions are a standard feature. An



Pedersen Model VPU-1 Milling Machine

January, 1957

Single Flute Carbide Tools

FOR

BORING • MILLING ROUTING • PROFILING



OPEN FLUTE DESIGN for easy alteration and maximum chip clearance.



CLOSED FLUTE DESIGN for added strength and extra cutting edge length.

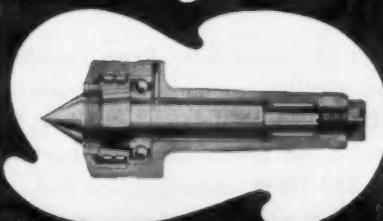
ECONOTOOL CO.

JENKINTOWN, PA.

For more data circle 553 on Reader Service Card

NIELSEN

**Heavy Duty
Live Centers**



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

*Write for catalog
M on live centers.*

NIELSEN, INC. LAWTON,
MICHIGAN

For more data circle 554 on Reader Service Card

new shop equipment . . .

oversize table with longitudinal rapid traverse is available. The gears are made of hardened and ground chrome-nickel steel.

Accessories, such as dividing head, vertical milling attachment, circular milling attachment, slotting attachment and vises are available.

For more data circle 141 on Reader Service Card

HOLE GRINDING BURS

The Atrax Co., Newington 11, Conn., has announced its 1903 Series of miniature hole grinding burs, which has been designed to meet the need for grinding unusually small holes in hardened steel up to Rockwell C-64.

There are 17 different tools in this series, all on $\frac{1}{8}$ inch shank. This tool was developed to replace mounted grinding points regardless of materials

to be ground or hardness and so on. With only a few passes, the miniature hole grinding bur is said to remove up to 0.006 and 0.008 inch stock with a finish of 2 micro-inches or better. Recommended speed is 100,000 r.p.m. or better. These grinding burs will remove stock fast and effortlessly. According to the manufacturer, they will not load, create little or no heat

EFFECTIVE EFFICIENT ECONOMICAL

**way to HOLD your
work — and your
business WITH**

Zagar COLLETS

Don't be caught short! Keep a supply of Zagar collets on hand. Five types: No. 310 Zagar Master; Nos. 2 and 6 W. & S.; No. 5-C; No. 6 W. & S. pads. All but Zagar No. 310 are standard machine tool sizes. All collets are made of oil-hardened tool steel; have flat tops for locating purposes.

Write for Zagar's Catalog S-1

ZAGAR, INC., 23898 Lakeland Blvd., Cleveland 23, Ohio

Zagar

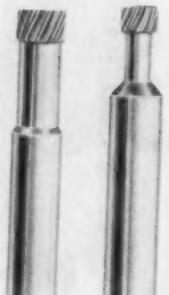
TOOLS FOR INDUSTRY and SPECIAL MACHINERY

For more data circle 555 on Reader Service Card

**ZAGAR
STANDARD
MACHINE TOOL
SIZES FIT ALL
MAKES**



*Order by mail for
shipment from stock.*



**Atrax 1903 Series
Hole Grinding Burs**

and prevent distortion in piece parts. They can be resharpened in the spindle with a diamond hone, thus eliminating setup and resetting of machine. For more data circle 142 on Reader Service Card

★ ★ ★

SELF-CENTERING DRILL JIG

The B and B Specialty Co., Alpine Ave., Dept. A, Rossmoyn, Ohio, has introduced an assembly which includes a vee block, adjustable hold-down clamp, adjustable drill bushing holder and adjustable stop. The vee block is mounted on a plate, which may be clamped or bolted to a drill press. The drill bushing holder is bored to accommodate most any standard drill bushing.

There are three sizes of vee blocks available: the 7 inch vee block has a capacity up to $\frac{1}{8}$ inch round stock; the $9\frac{1}{2}$ inch vee block has a capacity up to $1\frac{3}{4}$ inch round stock; and the 12 inch vee block has a capacity up to $2\frac{3}{4}$ inch round stock.

The B and B Self-Centering Drill Jig can also be used for keyway milling



View of B and B Self-Centering Drill Jig
merely by removing the drill bushing holder from the jig.

For more data circle 143 on Reader Service Card

FREE CATALOG

tells why

DY-NAMIC BALANCING

should be a regular part of **EVERY MAINTENANCE OPERATION**

This newest-edition Dy-Namic Balancing Catalog contains information on latest technological advancements to improve maintenance work.

Shows how to improve performance of overhauled or repaired machinery and parts, by eliminating mechanical failures and assuring greater efficiency.

Explains how Dy-Namic Balancing keeps equipment operating without interruption. See how periodic checking and Dy-Namic Balancing of rotating parts will reduce bearing wear and noise, as well as eliminate costly downtime for repairs.

For your free copy, write: Bear Mfg. Co., Dept. M-25, Rock Island, Illinois.

24 PAGES OF VALUABLE INFORMATION LIKE THIS:

- How To Balance Parts From 4 Oz. to 8 Tons!
- What is Dy-Namic Un-balance?
- The Difference Between Static and Dy-Namic Un-balance!
- How To Balance Rotating Parts Statically and Dy-Namically In One Operation!
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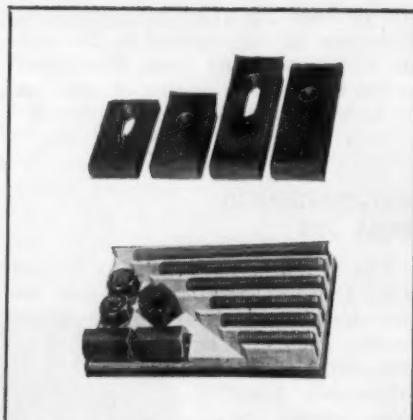
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new shop equipment . . .

STRAP CLAMPS AND STUD SETS

Podlin Tool Co., 11917 Franklin Ave., Franklin Park, Ill., is now marketing two new products; namely,



View of Podlin Strap Clamp and Stud Set

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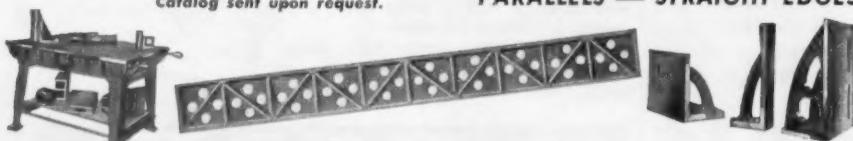
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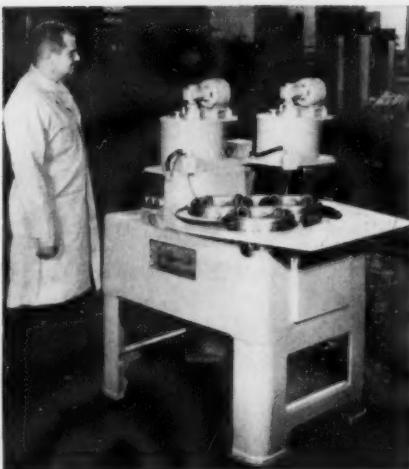
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**DUAL AGITATOR TANK
ATTACHMENT PERMITS BOTH
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Crane Model 24 Lapmaster Lapping Machine

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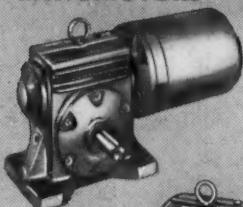
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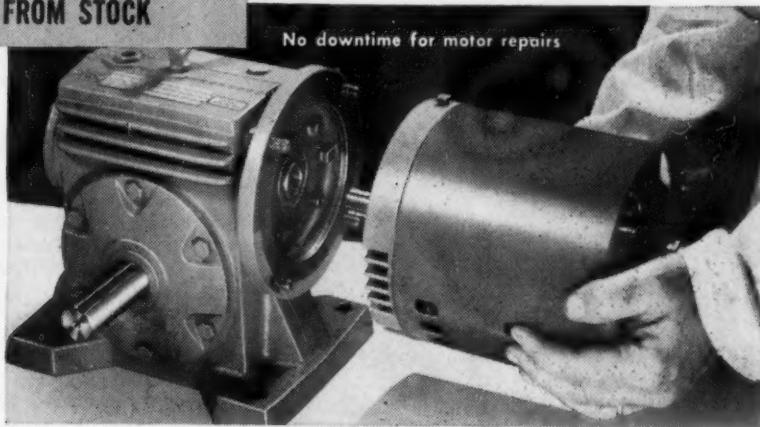
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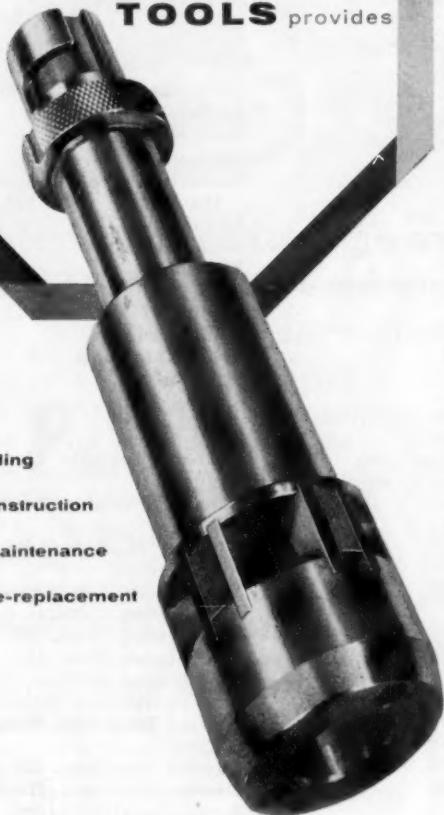
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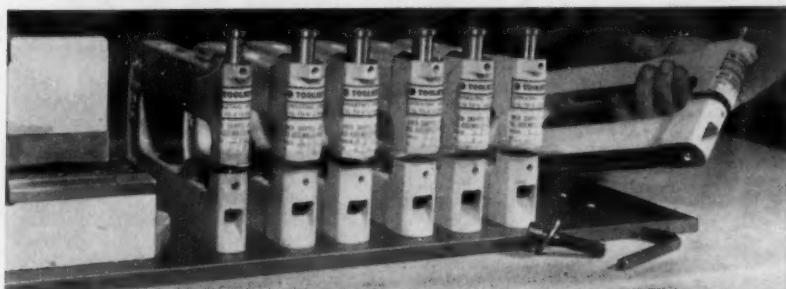
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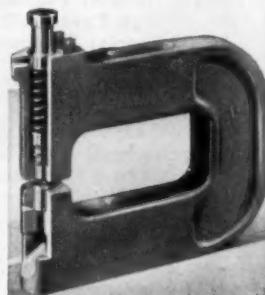


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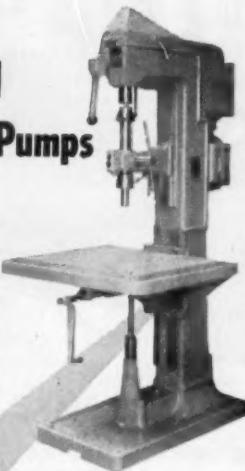
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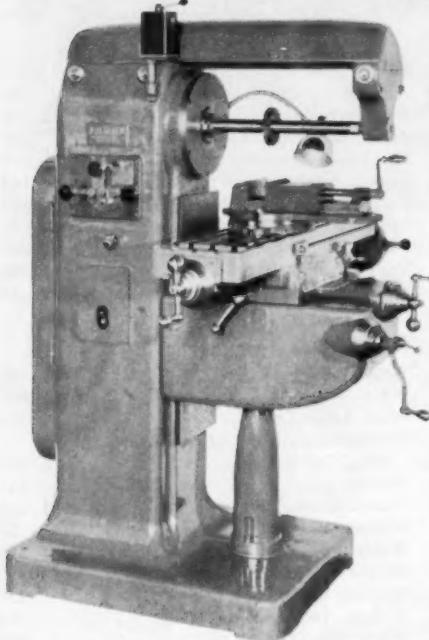
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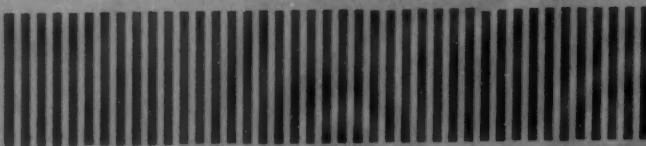
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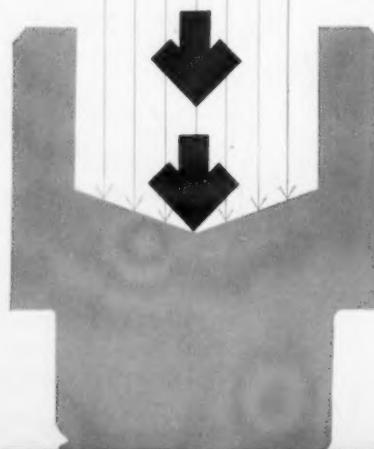


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